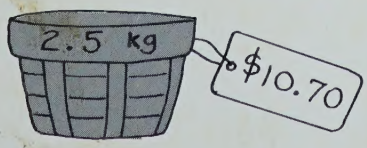
starting points in mathematics 6

blackline masters

Olson's Farm

What is inside each basket?



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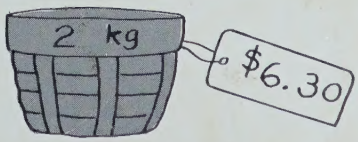

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Blackline Masters for

starting points in mathematics

Level 6

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To the Teacher

This book is designed for use with *Starting Points in Mathematics 6 Revised* and provides the following.

Contents of Blackline Masters	T2–T3
Teacher's Notes	T4–T6
Reduced Blackline Masters with Answers	T7–T30
Blackline Masters	1–96

Masters 1 to 64 provide reteaching lessons for key lessons in the student text. Masters 65 to 80 provide problem-solving extensions for the problem-solving lessons in the student text. Masters 81 to 96 provide enrichment lessons for each unit. The Contents on page T2 and T3 suggest the corresponding student text page with which each reteaching and problem-solving master may be used. The student text page also appears at the top of each of these masters. The corresponding unit suggested for each enrichment master is identified on the Contents page and again on the top of the master. It must be kept in mind, however, that the most appropriate time for use of each master is best determined by the teacher for his or her particular class.

On the reteaching masters, one or more answers are provided to allow students to determine whether they are proceeding correctly. For any exercise with a domino beside it, students can find a corresponding domino with the answer at the bottom of the page.

Before assigning independent work, the teacher should make certain that the directions are understood by the students. When a page has been completed, the teacher and the students should discuss and correct the responses together. Better learning will occur if the correction can take place as soon as possible after the page is completed.

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Teacher's Notes

1. On this page students compare numbers through hundred thousands. Review the directions to the activity before assigning the page.

2. It may be helpful to begin by providing some exercises that review rounding to tens, hundreds and thousands.

3. Students can place each of these decimal numbers in a place-value chart.

4. As an additional exercise, students can estimate the sum for each of the exercises on this page.

5. The purpose of this page is to provide review in addition.

6. This page provides review in subtraction of up to 5-digit numbers. No regrouping is required.

7. For additional practice, students can use addition to check each of their answers.

8. Before beginning the page, some students may need practice in regrouping.

9. For additional practice, students can take classroom surveys and make bar graphs to record the results.

10. Emphasize that in an ordered pair the first number tells how far to move along the horizontal number line and the second number tells how far to move along the vertical number line.

11. The purpose of this page is to teach students how to read and interpret a broken-line graph. Students are asked to transfer information from a chart to a graph.

12. For students who need extra help with multiplication facts, you can represent each exercise with an array.

13. Before assigning the page, students should be able to complete exercises such as 6×4 hundreds = _____ hundreds.

14. Discuss the sample multiplication with your students. Emphasize that 24×3 hundreds means 72 hundreds.

15. Show your students that the sample multiplication is the same as $(45 \times 5) + (45 \times 1$ ten).

16. Emphasize the concept of sharing as the students complete this page.

17. Students having difficulty with place value in division should rewrite the exercises on lined paper held sideways.

18. Emphasize that using multiplication to check each division will help to make sure that the students used the correct number of digits in the quotients.

19. Discuss the meaning of an average when reviewing the sample problem with the students.

20. Before discussing the sample division exercise, have the students find the quotient of $4680 \div 6$.

21. Remind students to round each divisor in order to estimate the first digit of the quotients.

22. You may wish to show an additional sample exercise in which rounding the divisor leads to a trial quotient that is too small.

23. It may be helpful to have the students put each of the decimals in a place-value chart.

24. Use diagrams of tenths, hundredths and thousandths to emphasize that adding a zero to the end of a decimal does not change the value of the decimal.

25. When writing an example in vertical form, make sure that the students are lining up the decimal points.

26. Remind students that a whole number, such as 4, can be written as 4.0, 4.00, or 4.000.

27. For each number in the chart, ask your students to tell which two whole numbers it comes between.

28. Have students compare the estimated sums and differences with the exact sums and differences.

29. Discuss the rule for finding the perimeter of a regular polygon and review the samples with your students.

30. Provide grid paper for those students having difficulty with the concept of area. Figures 1-6 can be redrawn on the grid paper.

31. Discuss the term *height* as it applies to a triangle. Have students point out the height of each triangle.

32. Students having difficulty with the concept of volume should begin by building with cubes.

33. Show students that 12.4×6 is the same as 124 tenths $\times$ 6.

34. Students can estimate products in order to place the decimal point correctly.

35. Emphasize those examples where it is necessary to add zeros to get the correct product.

36. For exercises 9-15 point out that there is no need to do each division.

37. Emphasize the need to add zeros to the dividend in order to continue dividing.

38. Discuss the chart at the top before assigning the page.

39 Review the relationships in the chart with the students.

40 Check to see that the students are using the proper scale on the protractor.

41 Make sure that each student has a ruler to work with before assigning the page.

42 Discuss the map with the students. Make sure they understand the scale.

43 Discuss the magic square with the students.

44 Have students name the numbers they are multiplying or dividing by for each exercise.

45 Explain the meaning of like or common denominators as you review the sample problem.

46 Cut fractional parts out of paper plates and have students add and subtract fractions using the plates.

47 Use diagrams to help show the equivalent fractions and their sums.

48 Use diagrams to show the sample addition example.

49 Use a diagram of equivalent fractions to show the sample problem.

50 When reviewing the sample problem with the students, emphasize the regroupings.

51 Remind students to reduce each product to lowest terms. You may wish to introduce short cuts in multiplication of fractions.

52 Review with the students the definition of a reciprocal.

53 Show students the examples in which it is easier to change to common denominators than to equivalent decimals.

54 Emphasize that a ratio is a comparison of two or more things.

55 Review the sample and make sure that the students understand how the diagram suggests the given ratios.

56 Ask the students to name what they are multiplying or dividing by in each exercise.

57 You may wish to discuss unit pricing for comparison shopping at this point.

58 Emphasize that percent always means "out of 100."

59 Show the students that it is often easier to write an equivalent fraction with a denominator of 100 than it is to divide to form a decimal.

60 Emphasize that each percent can be described as a decimal and as a fraction.

61 Show the students that in some cases changing the percent to a fraction rather than a decimal will make the multiplication easier.

62 Review the rules for multiplying decimals by 10, 100, and 1000.

63 Emphasize that the students should use arrows to make the decimal points.

64 Review the directions for the unit pricing activity before assigning the page.

65 Let students start on this page without an introduction. When they have finished, you may wish to have them make up similar problems that they can share with the class.

66 Be sure students understand what they are to do. You may wish to have them solve the problems after they have identified the needed and the extraneous information.

67 You may wish to assign which item of information you want particular students to find.

68 This page reviews some of the problem-solving skills that students have learned over the years. Be sure they understand the task; in exercise 1, tell them that the numbers have been *covered up* by the square and the triangle.

69 These problems are applications of decimal addition and subtraction. You may wish to have students make up other problems that they can share with the class.

70 This page provides students with the opportunity to examine tree diagrams, and then to find the number of possibilities without drawing tree diagrams.

71 Be sure that students understand the diagram of the bookcase. Emphasize that the boards used to make the bookcase are the correct width. Only the length needs to be calculated. In exercise 4, be sure that students understand the vocabulary of chequing accounts.

72 When students have completed this page, discuss the answers with the class to make sure that they recognize the function of various units, e.g., cm^2 for area.

73 You may wish to have students make up some other cook-out problems.

74 Allow students to work on this problem for several days, if needed. If some are having difficulty getting started, suggest that they make a list of whom each person is friendly with, e.g. Donna-Ken, Donna-Elaine, Donna-Ian, etc.

75 If students have trouble with this page, suggest that they write each message vertically and place the count beside each symbol.

76 You may wish to go over the examples with students. Tell them that probabilities are generally expressed as fractions in lowest terms.

77 Discuss with students that sales tax is added after the discount is calculated. Some students may find it helpful to make a chart.

78 Provide the materials and let students work on this project when they have time.

79 Suggest that students make up similar short cuts.

80 This page is a review of problem-solving skills. For exercise 1, you may wish to group students to take the various surveys. For exercises 6 and 7, suggest that tables would simplify their work.

81 Emphasize that although there are many ways to write each number, in scientific notation one factor must be between 1 and 10.

82 Tell students that within each problem a given shape will always represent the same number.

83 Point out the key that is given on the bar graph.

84 Before assigning the page, complete a sample problem with your students so that they see the logic needed to solve the problems.

85 The purpose of this page is to make sure that students understand the values of the decimals they have been working with.

86 Have students draw lines to divide the pattern into figures whose areas the students can compute using formulas.

87 Students use reverse logic and division skills to complete this page.

88 Have students draw lines to divide the figures into rectangular shapes.

89 After the octahedron is complete, have your students point out the faces, edges and vertices.

90 Discuss the flow chart with your students before assigning the page.

91 Completing the puzzle will be easier if students write the fractions in unreduced form as well as in reduced form.

92 As an additional activity, students can make scale drawings of their own rooms.

93 Discuss that in a circle graph the entire circle must equal 100%.

94 Have the students put the figures in a pile in the order they drew them to make the figure run backwards.

95 Remind your students to work carefully, as one wrong answer will affect the entire path.

96 Emphasize that the students are adding the integers as they travel along the maze.

NAME

SPM 6 Masters
With pages 8-9

1

Comparing and Ordering Numbers

Which is greater, 218 324 or 218 295?

Compare each digit.

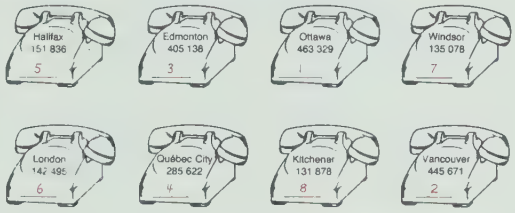
hundred thousands	ten thousands	thousands	hundreds	tens	ones
2	1	8	3	2	4
2	1	8	2	9	5
same	same	same	3 hundreds > 2 hundreds so, 218 324 > 218 295		

Write >, <, or = to make true statements.

1. 51 248 ___ 51 268
2. 81 020 ___ 81 200
3. 998 765 ___ 998 765
4. 400 102 ___ 400 010
5. 453 986 ___ 453 968
6. 312 406 ___ 321 406
7. 719 057 ___ 719 056
8. 460 001 ___ 460 011

Calling All Mathematicians

Using the numbers 1 to 8, rank the cities in order from greatest to least, according to the number of telephones in each.



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NAME

SPM 6 Masters
With pages 10-11

2

Rounding

Round 475 283 to the nearest thousand, ten thousand, and hundred thousand.

Round to the nearest	What is the digit to the right of the rounding place?	Is the digit 5 or greater?	Round
thousand	2	no	down to 475 000
ten thousand	5	yes	up to 480 000
hundred thousand	7	yes	up to 500 000

Complete the chart. Round to the nearest thousand, ten thousand, and hundred thousand.

		thousand	ten thousand	hundred thousand
1.	123 467	123 000	120 000	100 000
2.	565 070	565 000	570 000	600 000
3.	194 513	195 000	190 000	200 000
4.	608 924	609 000	610 000	600 000
5.	889 756	890 000	890 000	900 000

Find the Hidden Number.

Round each number written in hundreds to the nearest hundred.
Round each number written in thousands to the nearest thousand.
Shade all squares whose numbers round to 700.
Shade all squares whose numbers round to 4000.

701 700	403 400	716 700	3800 4000	3975 4000	4516 5000	4416 4000
4200 4000	821 800	689 700	822 800	702 700	804 800	4316 4000
699 700	758 800	3986 4000	651 700	650 700	1921 2000	651 700

The hidden number is 101.

123 000, 120 000, 100 000

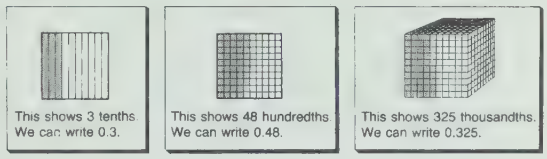
NAME

SPM 6 Masters
With pages 12-13

3

Decimals

Study the charts.



Write the decimals.

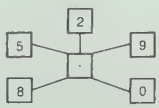
1. 9 tenths 0.9
2. one and twenty-four thousandths 1.024
3. 13 hundredths 0.13
4. fifteen and two-hundredths 15.02
5. thirty-six thousandths 0.036
6. thirty and six-thousandths 30.006

What does each two mean?

7. 1.020 2 hundredths
8. 1.200 2 tenths
9. 2.100 2 ones
10. 11.002 2 thousandths

Creating Decimals

Using 4 of the given digits and the decimal point, follow the directions below to create a number. Do not repeat a digit in any one answer. Answers may vary.



Create a number with

11. 2 in the hundredths place. 5.928
12. 9 in the tenths place. 5.928
13. 8 in the ones place and 5 in the tenths place. 8.502
14. 0 in the hundredths place and 5 in the ones place. 5.809
15. 5 in the tenths place and 8 in the thousandths place. 9.528

0.9 2 hundredths

NAME

SPM 6 Masters
With pages 18-19

4

Adding Two Numbers

Add 136 and 275.

Add the ones.

$$\begin{array}{r} {\scriptstyle 1} \\ 136 \\ +\,275 \\ \hline 1 \end{array}$$

Regroup 11 ones as 1 ten 1 one

Add the tens.

$$\begin{array}{r} {\scriptstyle 11} \\ 136 \\ +\,275 \\ \hline 11 \end{array}$$

Regroup 11 tens as 1 hundred 1 ten.

Add the hundreds.

$$\begin{array}{r} {\scriptstyle 11} \\ 136 \\ +\,275 \\ \hline 411 \end{array}$$

The sum of 136 and 275 is 411.

Round to the nearest ten and add to estimate each sum.

1. $\begin{array}{r} 26 \\ +\,58 \\ \hline \end{array}$ $\begin{array}{r} 30 \\ +60 \\ \hline 90 \end{array}$
2. $\begin{array}{r} 18 \\ +\,47 \\ \hline \end{array}$ $\begin{array}{r} 20 \\ +50 \\ \hline 70 \end{array}$
3. $\begin{array}{r} 133 \\ +\,96 \\ \hline \end{array}$ $\begin{array}{r} 130 \\ +100 \\ \hline 230 \end{array}$

Add.

4. $\begin{array}{r} 63 \\ +\,34 \\ \hline 97 \end{array}$
5. $\begin{array}{r} 25 \\ +\,56 \\ \hline 81 \end{array}$
6. $\begin{array}{r} 205 \\ +\,82 \\ \hline 287 \end{array}$
7. $\begin{array}{r} 119 \\ +\,63 \\ \hline 182 \end{array}$
8. $\begin{array}{r} 2.46 \\ +\,3.58 \\ \hline 6.04 \end{array}$
9. $\begin{array}{r} 4.07 \\ +\,5.93 \\ \hline 10.00 \end{array}$
10. $\begin{array}{r} 749 \\ +\,242 \\ \hline 991 \end{array}$
11. $\begin{array}{r} 529 \\ +\,199 \\ \hline 728 \end{array}$

Here is a code.

703	87	201	610	100	382
S	A	E	R	H	O

Who always sleeps with his shoes on? Add to answer the riddle.

$\begin{array}{r} 63 \\ +\,24 \\ \hline 87 \end{array}$	$\begin{array}{r} 21 \\ +\,79 \\ \hline 100 \end{array}$	$\begin{array}{r} 124 \\ +\,258 \\ \hline 382 \end{array}$	$\begin{array}{r} 103 \\ +\,507 \\ \hline 610 \end{array}$	$\begin{array}{r} 412 \\ +\,291 \\ \hline 703 \end{array}$	$\begin{array}{r} 136 \\ +\,65 \\ \hline 201 \end{array}$
A	H	O	R	S	E

97 6.04 30 + 60 = 90

NAME

SPM 6 Masters
With pages 20-21

5

Adding More Than Two Numbers

A circus sold 529 tickets on Friday, 361 tickets on Saturday, and 478 tickets on Sunday. How many tickets were sold altogether?

Place the numbers in vertical form and add.

Add the ones.

$$\begin{array}{r} {\scriptstyle 1\ \ \ } \\ 529 \\ 361 \\ +\,478 \\ \hline 8 \end{array}$$

Regroup 18 ones as 1 ten 8 ones.

Add the tens.

$$\begin{array}{r} {\scriptstyle 11\ \ } \\ 529 \\ 361 \\ +\,478 \\ \hline 68 \end{array}$$

Regroup 16 tens as 1 hundred 6 tens.

Add the hundreds.

$$\begin{array}{r} {\scriptstyle 11\ \ } \\ 529 \\ 361 \\ +\,478 \\ \hline 1368 \end{array}$$

Regroup 13 hundreds as 1 thousand 3 hundreds.

There were 1368 tickets sold altogether.

Add.

1. $\begin{array}{r} 27 \\ 14 \\ +\,38 \\ \hline 79 \end{array}$
2. $\begin{array}{r} 125 \\ 36 \\ +\,197 \\ \hline 358 \end{array}$
3. $\begin{array}{r} 66 \\ 109 \\ +\,85 \\ \hline 260 \end{array}$
4. $\begin{array}{r} 196 \\ 234 \\ +\,421 \\ \hline 851 \end{array}$
5. $\begin{array}{r} 324 \\ 467 \\ +\,103 \\ \hline 894 \end{array}$
6. $\begin{array}{r} 1046 \\ 323 \\ 3158 \\ +\,4962 \\ \hline 9489 \end{array}$
7. $\$10.63 + \$124.32 + \$4.93 = \underline{\$139.88}$

Special Sums

Add each row vertically and horizontally. What do you notice about the sums?

They all equal 535.

125	247	163	535
94	103	338	535
316	185	34	535
535	535	535	

894 79 67

NAME

SPM 6 Masters
With pages 24-25

6

Subtraction with No Regrouping

Lou is reading a book that has 289 pages. He has already read 137 pages. How many pages does he have left to read?

Subtract 137 from 289.

Subtract the ones.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 2 \end{array}$$

Subtract the tens.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 52 \end{array}$$

Subtract the hundreds.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 152 \end{array}$$

Check the answer by adding.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 152 \end{array} \quad \text{add} \quad \begin{array}{r} 137 \\ +\,152 \\ \hline 289 \end{array}$$

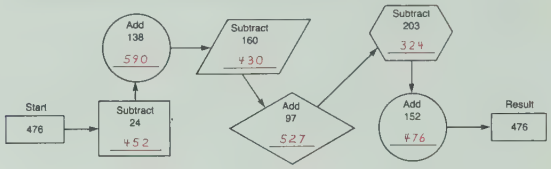
Lou has 152 pages left to read.

Subtract. Add to check.

1. $\begin{array}{r} 39 \\ -\,22 \\ \hline 17 \end{array}$ $\begin{array}{r} 22 \\ +\,17 \\ \hline 39 \end{array}$
2. $\begin{array}{r} 74 \\ -\,43 \\ \hline 31 \end{array}$ $\begin{array}{r} 43 \\ +\,31 \\ \hline 74 \end{array}$
3. $\begin{array}{r} 180 \\ -\,140 \\ \hline 40 \end{array}$ $\begin{array}{r} 140 \\ +\,40 \\ \hline 180 \end{array}$
4. $\begin{array}{r} 6897 \\ -\,2747 \\ \hline 4150 \end{array}$ $\begin{array}{r} 2747 \\ +\,4150 \\ \hline 6897 \end{array}$
5. $\begin{array}{r} 82758 \\ -\,60437 \\ \hline 22321 \end{array}$ $\begin{array}{r} 60437 \\ +\,22321 \\ \hline 82758 \end{array}$
6. $\begin{array}{r} \$79.48 \\ -\,59.36 \\ \hline \$20.12 \end{array}$ $\begin{array}{r} \$59.36 \\ +\,20.12 \\ \hline \$79.48 \end{array}$

Mystery Machine

Start with the number 476. Follow the directions. If you add and subtract carefully, you will end with the number 476.



17, 22 | 39 | 17 + 22 | 39
4150, 2747 | 6897 | 4150 + 2747 | 6897

NAME

SPM 6 Masters
With pages 26-27

7

Subtraction with Regrouping

Subtract 147 from 334.

Regroup 3 tens 4 ones as 2 tens 14 ones. Subtract the ones.

$$\begin{array}{r} {\scriptstyle 2\ 1\ \ } \\ 3\not{3}\not{4} \\ -\,147 \\ \hline 7 \end{array}$$

Regroup 3 hundreds 2 tens as 2 hundreds 12 tens. Subtract the tens.

$$\begin{array}{r} {\scriptstyle 12\ \ } \\ 2\not{3}\not{4} \\ -\,147 \\ \hline 87 \end{array}$$

Subtract the hundreds.

$$\begin{array}{r} {\scriptstyle 12\ \ } \\ 2\not{3}\not{4} \\ -\,147 \\ \hline 187 \end{array}$$

Check by adding. $\begin{array}{r} {\scriptstyle 11\ \ } \\ 187 \\ +\,147 \\ \hline 334 \end{array}$ The difference is 187.

Subtract.

1. $\begin{array}{r} 76 \\ -\,29 \\ \hline 47 \end{array}$
2. $\begin{array}{r} 85 \\ -\,37 \\ \hline 48 \end{array}$
3. $\begin{array}{r} 28 \\ -\,19 \\ \hline 9 \end{array}$
4. $\begin{array}{r} 174 \\ -\,28 \\ \hline 146 \end{array}$
5. $\begin{array}{r} 421 \\ -\,213 \\ \hline 208 \end{array}$
6. $\begin{array}{r} 4986 \\ -\,2897 \\ \hline 2089 \end{array}$
7. $\begin{array}{r} 7229 \\ -\,5249 \\ \hline 1980 \end{array}$
8. $\begin{array}{r} \$34.21 \\ -\,16.45 \\ \hline \$17.76 \end{array}$

Number Search

Subtract. Each answer can be found horizontally, vertically, or diagonally. The first one is done for you.

9. $\begin{array}{r} 294 \\ -\,169 \\ \hline 125 \end{array}$
10. $\begin{array}{r} 392 \\ -\,98 \\ \hline 294 \end{array}$
11. $\begin{array}{r} 812 \\ -\,185 \\ \hline 627 \end{array}$
12. $\begin{array}{r} 7213 \\ -\,789 \\ \hline 6424 \end{array}$

1	3	7	6
0	2	9	4
6	8	5	2
7	1	0	4

13. $2111 - 1957 = \underline{154}$
14. Subtract 275 from 381. 106

47 208

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8

Subtraction, Regrouping with Zeros

Subtract 785 from 2000.

Regroup 200 tens 0 ones as 199 tens 10 ones.

$$\begin{array}{r} {\scriptstyle 19\ 9\ 10} \\ 2\not{0}\not{0}\not{0} \\ -\,785 \\ \hline 5 \end{array}$$

Subtract.

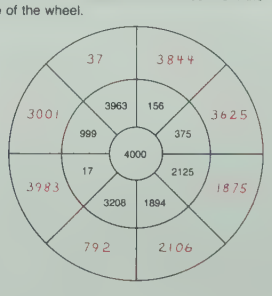
$$\begin{array}{r} {\scriptstyle 19\ 9\ 10} \\ 2\not{0}\not{0}\not{0} \\ -\,785 \\ \hline 1215 \end{array}$$

The difference is 1215.

Subtract.

1. $\begin{array}{r} 60 \\ -\,24 \\ \hline 36 \end{array}$
2. $\begin{array}{r} 400 \\ -\,286 \\ \hline 114 \end{array}$
3. $\begin{array}{r} 308 \\ -\,89 \\ \hline 219 \end{array}$
4. $\begin{array}{r} 5040 \\ -\,2995 \\ \hline 2045 \end{array}$
5. $\begin{array}{r} 10000 \\ -\,4723 \\ \hline 5277 \end{array}$
6. $\begin{array}{r} 23070 \\ -\,16382 \\ \hline 6688 \end{array}$
7. $\begin{array}{r} \$20.00 \\ -\,10.79 \\ \hline \$9.21 \end{array}$
8. $\begin{array}{r} \$107.04 \\ -\,88.15 \\ \hline \$18.89 \end{array}$

Complete the subtraction wheel. Subtract each number from the number in the middle of the wheel.



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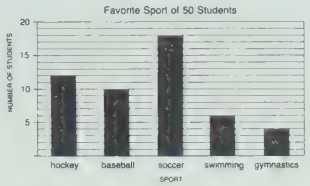
9

Bar Graphs

A bar graph organizes information in picture form. This graph shows the results when 50 students were asked to name their favorite sport.

The graph shows that 12 students named hockey as their favorite sport.



Use the bar graph above to answer the questions.

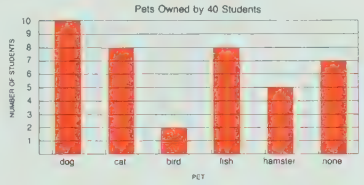
1. How many students named each sport?

   baseball 10 soccer 18 swimming 6 gymnastics 4

2. Which sport was named by the greatest number of students? soccer
3. How many students in all named hockey, soccer, or baseball as their favorite sport? 40
4. How many more students preferred soccer to swimming? 12

The chart shows the results when 40 sixth grade students were asked to name the pet they owned. Complete the bar graph to show this information.

Pet	Number of Students
dog	10
cat	8
bird	2
fish	8
hamster	5
none	7



10, 18, 6, 4

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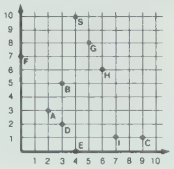
10

Ordered Pairs of Numbers and Points on a Grid

Every point on a grid can be represented by an ordered pair of numbers. The first number tells how many units to move over on the horizontal number line and the second number tells how many units to move up on the vertical number line.

Point **A** is found by moving over 2, then up 3. Point **A** can be matched with the ordered pair (2,3).



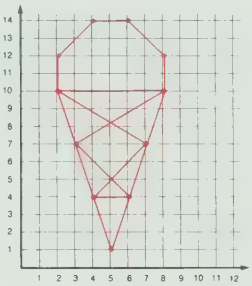
Write the ordered pair that matches each point.

1. Point B (3,5)
2. Point C (9,1)
3. Point D (3,2)
4. Point E (4,0)
5. Point F (0,7)
6. Point G (5,8)
7. Point H (6,6)
8. Point S (4,10)
9. Point T (7,1)

Dot-to-Dot

Plot each ordered pair. Connect the points in order as you plot them.

A (8,10)
B (8,12)
C (6,14)
D (4,14)
E (2,12)
F (2,10)
G (5,1)
H (8,10)
I (2,10)
J (7,7)
K (4,4)
L (6,4)
M (3,7)
A (8,10)



(4,0) (6,6) (3,5)

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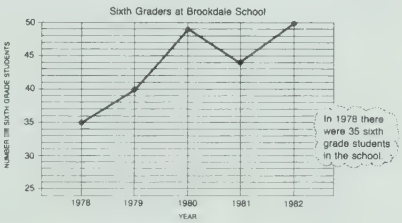
11

Broken-Line Graphs

Brookdale School opened in 1978. The points on the line graph show the number of students in the sixth grade during each year since then. The points can be connected to show an increase or decrease from one year to next.

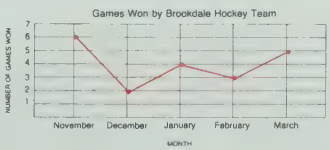


Use the graph above to answer the questions.

1. How many sixth graders attended the school in 1980? 49
2. Between which two years did the sixth grade population increase the most? 1979–1980
3. Between which two years did the sixth grade population decrease? 1980 – 1981
4. How many more sixth graders attended Brookdale School in 1982 than in 1979? 10
5. In which year were there 50 sixth grade students? 1982

The chart shows the number of games that the Brookdale School hockey team won during a five-month season. Make a broken-line graph to show the number of games won from November to March.

Month	Number of Wins
November	6
December	2
January	4
February	3
March	5



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12

Basic Multiplication Facts

Mrs. Huber's classroom has 5 rows of desks with 4 desks in each row. How many desks are there in the classroom?

We can add.
4 + 4 + 4 + 4 + 4 = 20

We can multiply.
5 × 4 = 20

There are 20 desks in all.

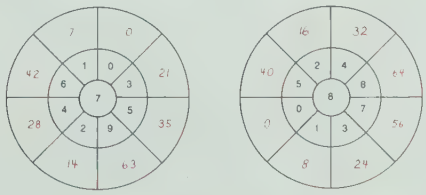
Multiply.

1. 6 × 2 = 12
2. 4 × 6 = 24
3. 7 × 1 = 7
4. 8 × 5 = 40
5. 9 × 7 = 63
6. 7 × 9 = 63
7. 8 × 8 = 64
8. 0 × 9 = 0
9. 1 × 1 = 1
10. 5 × 0 = 0
11. 5 × 5 = 25
12. 3 × 4 = 12

Complete to make true statements. For some problems there is more than one correct answer.

13. 5 × 3 = 15
14. 3 × 6 = 18
15. 2 × 2 = 4
16. 0 × 6 = 0
17. 3 × 0 = 0
18. 3 × 8 = 24
19. 9 × 4 = 36
20. 6 × 6 = 36
21. 5 × 0 = 0

Complete each number wheel. Multiply each number by the number in the middle.



0 12 1 4 63 15

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13

Multiplying by a One-Digit Number

John collects postage stamps. He has 4 books with 135 stamps in each book. How many stamps does he have?

Multiply the ones.

$$\begin{array}{r} {\scriptstyle 2} \\ 135 \\ \times\ 4 \\ \hline 0 \end{array}$$

5 × 4 = 20 ones
or 2 tens 0 ones.

Multiply the tens.

$$\begin{array}{r} {\scriptstyle 12} \\ 135 \\ \times\ 4 \\ \hline 40 \end{array}$$

4 × 3 tens = 12 tens.
2 more tens make
14 tens
or 1 hundred 4 tens.

Multiply the hundreds.

$$\begin{array}{r} {\scriptstyle 12} \\ 135 \\ \times\ 4 \\ \hline 540 \end{array}$$

4 × 1 hundred
= 4 hundreds.
1 more hundred makes
5 hundreds.

John has 540 stamps in his collection.

Multiply.

1. $21 \times 4 = 84$
2. $19 \times 3 = 57$
3. $132 \times 2 = 264$
4. $149 \times 3 = 447$
5. $800 \times 6 = 4800$
6. $621 \times 7 = 4347$
7. $314 \times 8 = 2512$
8. $1475 \times 5 = 7375$

9. A train travels at an average speed of 75 km/h. How many kilometres can it travel in 4 h? 300 km
10. A grocery store receives a shipment of 9 cases of soda. Each case contains 24 bottles. How many bottles are there altogether? 216

Here is a code.

2015	1086	350	184	224	960	2763	7924
M	U	N	A	L	B	E	R

What goes up when the rain comes down? Multiply to answer the riddle.

46 × 4 = 184	175 × 2 = 350	362 × 3 = 1086	403 × 5 = 2015	160 × 6 = 960	1132 × 7 = 7924	921 × 3 = 2763	56 × 4 = 224	28 × 8 = 224	92 × 2 = 184
A	N	U	M	B	R	E	L	L	A

4800 · 84 · 300

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14

Multiplying by Multiples of 10, 100, and 1000

Multiply 24 and 300.

Multiply by 0 ones.

$$\begin{array}{r} 24 \\ \times\ 300 \\ \hline 0 \end{array}$$

Multiply by 0 tens.

$$\begin{array}{r} 24 \\ \times\ 300 \\ \hline 00 \end{array}$$

Multiply by 3 hundreds.

$$\begin{array}{r} {\scriptstyle 1} \\ 24 \\ \times\ 300 \\ \hline 7200 \end{array}$$

3 hundreds × 24
= 72 hundreds or
7 thousand 2 hundreds.

The product of 24 and 300 is 7200.

Multiply.

1. $16 \times 40 = 640$
2. $123 \times 50 = 6150$
3. $475 \times 10 = 4750$
4. $247 \times 20 = 4940$
5. $12 \times 300 = 3600$
6. $433 \times 400 = 173200$
7. $510 \times 600 = 306000$
8. $802 \times 2000 = 1604000$

Multiply without showing your work.

9. 60 × 10 = 600
10. 1000 × 12 = 12 000
11. 44 × 100 = 4400
12. 566 × 100 = 56 600
13. 100 × 208 = 20 800
14. 2030 × 100 = 203 000

Mystery Number

Multiply. Cross out each digit of the products in the number strip.
The digits left will form a multiple of 100 when put together.

0	1	0	2	0	2	0	0	0	0	5	0	0	6	0	0	0	0

15. $460 \times 20 = 9200$
16. $35 \times 300 = 10500$
17. $60 \times 6000 = 360000$

The number is 200.

3600 · 640 · 600 · 56 600

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15

Multiplying by a Two-Digit Number

The train ride at an amusement park can hold 45 passengers at a time. The train ride runs 15 times each day. How many passengers can the train carry in one day?

Multiply 45 and 15.

Multiply by the ones.

$$\begin{array}{r} {\scriptstyle 2} \\ 45 \\ \times\ 15 \\ \hline 225 \end{array}$$

Multiply by the tens.

$$\begin{array}{r} {\scriptstyle 2} \\ 45 \\ \times\ 15 \\ \hline 225 \\ 450 \end{array}$$

45 × 1 ten = 45 tens
= 4 hundreds 5 tens

Add.

$$\begin{array}{r} 45 \\ \times\ 15 \\ \hline 225 \\ +\ 450 \\ \hline 675 \end{array}$$

675 passengers can ride the train in one day.

Round each factor to the nearest ten and estimate the product.

1. $46 \times 24 \approx 50 \times 20 = 1000$
2. $87 \times 91 \approx 90 \times 90 = 8100$
3. $11 \times 55 \approx 10 \times 60 = 600$

Multiply.

4. $23 \times 12 = 276$
5. $78 \times 24 = 1872$
6. $97 \times 35 = 3395$
7. $501 \times 19 = 9519$
8. $125 \times 42 = 5250$
9. $370 \times 36 = 13320$
10. $1243 \times 12 = 14916$
11. $8049 \times 72 = 579528$

Complete the cross number puzzle.

Across	Down
A. 8 × 7	A. 21 × 25
B. 102 × 37	B. 34 × 10
E. 9 × 8	C. 431 × 18
F. 52 × 100	D. 6 × 7
H. 18 × 16	G. 72 × 3
J. 32 × 20	I. 9 × 9

276 · 50 × 20 = 1000 · 5250

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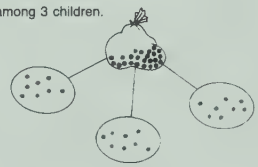
16

Using Multiplication to Divide

Eva has a bag of 24 marbles to divide evenly among 3 children. How many marbles will each child get?



Divide 24 by 3.

$$\begin{array}{r} 8 \\ 3\overline{)24} \\ 24 \\ \hline 0 \end{array}$$

Think: 3 × ? = 24
3 × 8 = 24.

Each child will get 8 marbles.

Suppose the bag contains 26 marbles. How many will each child get if they are again divided evenly?

$$\begin{array}{r} 8\ \text{R2} \\ 3\overline{)26} \\ 24 \\ \hline 2 \end{array}$$

Think: 3 × 8 = 24.
There is a remainder of 2.

Check by multiplying 3 × 8 = 24
Add the remainder → + 2
Total number of marbles → 26

Each child will get 8 marbles. There will be 2 extra marbles.

Divide. Check by multiplying.

1. $6 \div 3 = 18$ (3 × 6 = 18)
2. $48 \div 3 = 16$ (3 × 16 = 48)
3. $28 \div 5 = 5\ \text{R3}$ (5 × 5 + 3 = 28)
4. $72 \div 8 = 9$ (8 × 9 = 72)
5. $29 \div 9 = 3\ \text{R2}$ (9 × 3 + 2 = 29)
6. $58 \div 2 = 29$ (2 × 29 = 58)
7. $68 \div 9 = 9\ \text{R5}$ (9 × 7 + 5 = 68)
8. $31 \div 4 = 7\ \text{R3}$ (4 × 7 + 3 = 31)

Triangle Combination

For each set of numbers in a triangle, write one division and one multiplication sentence.

$9 \div 4 = 36$ · $8 \times 8 = 64$ · $5 \times 20 = 100$

3, 6 ÷ 3 = 18 · 3R2, 9 × 3 = 27 + 2 = 29

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Dividing by a One-Digit Number

Divide 486 by 4.

Divide 4 hundreds by 4.

$$\begin{array}{r} 1 \\ 4\overline{)486} \\ 400 \\ \hline 86 \end{array}$$

4 × 1 hundred

Divide 8 tens by 4.

$$\begin{array}{r} 12 \\ 4\overline{)486} \\ 400 \\ \hline 86 \\ 80 \\ \hline 6 \end{array}$$

4 × 2 tens

Divide 6 ones by 4.

$$\begin{array}{r} 121\ R2 \\ 4\overline{)486} \\ 400 \\ \hline 86 \\ 80 \\ \hline 6 \\ 4 \\ \hline 2 \end{array}$$

4 × 1

The quotient is 121 R2.

Divide.

1. $3\overline{)36}$ → 12; 30, 6, 6, 0
2. $5\overline{)27}$ → 5 R2; 25, 2
3. $8\overline{)76}$ → 9 R4; 72, 4
4. $9\overline{)99}$ → 11; 90, 9, 9, 0
5. $2\overline{)246}$ → 123; 200, 46, 40, 6, 6, 0
6. $4\overline{)896}$ → 224; 800, 96, 80, 16, 16, 0
7. $7\overline{)793}$ → 113 R2; 700, 93, 70, 23, 21, 2
8. $6\overline{)375}$ → 62 R3; 360, 15, 12, 3

Tick-Tack-Toe

Divide. You win when you get 3 of the same quotients in a row.

3)46 → 15 R1	5)28 → 5 R3	7)149 → 21 R2
6)72 → 12	8)121 → 15 R1	9)64 → 7 R1
8)71 → 8 R7	2)63 → 31 R1	4)61 → 15 R1

123 12

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Zero in the Quotient

Divide 408 by 4.

Divide 4 hundreds.

$$\begin{array}{r} 1 \\ 4\overline{)408} \\ 400 \\ \hline 0 \end{array}$$

1 × 4 hundreds

Divide 0 tens.

$$\begin{array}{r} 10 \\ 4\overline{)408} \\ 400 \\ \hline 08 \\ 0 \\ \hline 8 \end{array}$$

4 × 0 tens

Divide 8 ones.

$$\begin{array}{r} 102 \\ 4\overline{)408} \\ 400 \\ \hline 08 \\ 0 \\ \hline 8 \\ 8 \\ \hline 0 \end{array}$$

4 × 2 ones

The quotient is 102. Check by multiplying. $102 \times 4 = 408$

Divide. Check by multiplying.

1. $2\overline{)40}$ → 20; 20 × 2 = 40
2. $3\overline{)90}$ → 30; 30 × 3 = 90
3. $9\overline{)180}$ → 20; 20 × 9 = 180
4. $5\overline{)504}$ → 100 R4; 100 × 5 = 500; 500 + 4 = 504
5. $7\overline{)4907}$ → 701; 701 × 7 = 4907
6. $8\overline{)1603}$ → 200 R3; 200 × 8 = 1600; 1600 + 3 = 1603

For each row, circle the division example whose quotient is at the left.

102	(4)408	4)480
301	2)62	(2)602

130	(3)390	3)309
402	3)1260	(3)1206

504 = 500 + 4

100 R4 100

20, 20 × 5 = 40

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Finding the Average

The chart shows the amount of rain that fell in a certain city during 4 weeks in June.

	Rainfall
Week 1	10 cm
Week 2	8 cm
Week 3	9 cm
Week 4	6 cm

Find the average number of centimetres of rain that fell weekly.

Add the number of centimetres.

10 + 8 + 9 + 6 = 32 cm

Divide by the number of weeks.

$$4\overline{)32}\ \to\ 8$$

An average of 8 cm of rain fell each week.

Find the average for each set of numbers.

1. 6, 12 → 9
2. 8, 15, 22 → 15
3. 21, 46, 85, 92 → 61
4. 105, 112, 116 → 111
5. 9, 9, 9, 9, 9 → 9
6. $42, $56, $68, $86, $93 → $69
7. During one year in Toronto, it rained an average of 53 mm in January, 57 mm in February and 66 mm in March. What was the average rainfall for these months? 62 mm
8. In 6 classes there are 20, 25, 28, 29, 30 and 24 children. What is the average number of children in each class? 26
9. Mrs. Walters grades her students by finding the average of their test scores. Using the test scores below, find out which student gets the highest grade.

Jack	Terry	Sumi	Sam
85	93	65	94
92	69	100	67
72	84	90	85
83	82	85	82

Sumi gets the highest grade.

62 mm 6 111

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Dividing by Multiples of 10

Divide 4680 by 60.

Divide the 468 tens.

$$\begin{array}{r} 7 \\ 60\overline{)4680} \\ 420 \\ \hline 480 \end{array}$$

60 × 7 = 420; 60 × 8 = 480, which is too large

Divide the 480 ones.

$$\begin{array}{r} 78 \\ 60\overline{)4680} \\ 420 \\ \hline 480 \\ 480 \\ \hline 0 \end{array}$$

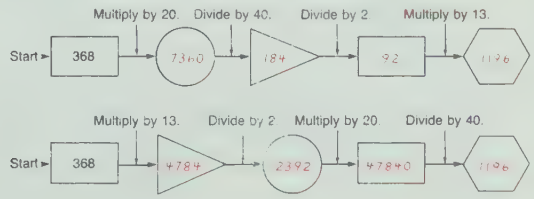
60 × 8

The quotient of 4680 and 60 is 78.

Divide.

1. $10\overline{)50}$ → 5; 50, 0
2. $20\overline{)380}$ → 19; 200, 180, 180, 0
3. $30\overline{)946}$ → 31 R16; 900, 46, 30, 16
4. $10\overline{)604}$ → 60 R4; 600, 4
5. $50\overline{)8750}$ → 175; 5000, 3750, 3500, 250, 250, 0
6. $40\overline{)9260}$ → 231 R20; 8000, 1260, 1200, 60, 40, 20
7. $20\overline{)6906}$ → 345 R6; 6000, 906, 800, 106, 100, 6
8. $80\overline{)8004}$ → 100 R4; 8000, 4

Follow the two paths. What do you notice about the results?



175 5

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Dividing by a Two-Digit Number

Divide 1374 by 22.

Divide the 137 tens.

$$22\overline{)1374}\quad 6$$
$$132$$
$$5$$

round 22 to 20

$6 \times 20 = 120$
$7 \times 20 = 140$

Divide the 54 ones.

$$22\overline{)1374}\quad 62\ R10$$
$$132$$
$$54$$
$$44$$
$$10$$

$2 \times 20 = 40$
$3 \times 20 = 60$

$1374 \div 22 = 62$ R10. Check by multiplying. $62 \times 22 = 1364 + 10 = 1374$.

Divide. Check by multiplying.

1. $21\overline{)84}$ 21 — 84×4, 0, 84
2. $18\overline{)20}$ 1 R2 — 18×1, 2, $18 + 2$, 20
3. $37\overline{)95}$ 2 R21 — 74×2, 21, $74 + 21$, 95
4. $43\overline{)921}$ 21 R18 — 86×43, 61, $903 + 18$, 921
5. $12\overline{)372}$ 31 — 36×12, 12, 372, 12, 0
6. $26\overline{)642}$ 24 R18 — 52×26, 122, 624, $104 + 18$, 18, 642
7. $23\overline{)4692}$ 204 — 4600, 92, 92, 0
8. $52\overline{)4953}$ 95 R13 — 4680×52, 273, 4940, $260 + 13$, 13, 4953

9. There are 768 seats in a theatre. There are 24 seats in each row. How many rows are there? 32

Break the Code

Each letter stands for a digit. Find the digit that goes with each letter make the division work.

$$21\overline{)79B}\quad CB$$
$$63$$
$$A6B$$
$$A6B$$
$$0$$

A = 1

B = 8

C = 3

4. $21 \times 4 = 84$ 5. $31 \times 12 = 372$ 32

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Dividing by a Two-Digit Number

Divide 708 by 24.

Divide the 70 tens.

$$24\overline{)708}\quad 3$$
$$72$$

Think: $20 \times$? Round 24 to 20. Think $3 \times 20 = 60$, $4 \times 20 = 80$. But $3 \times 24 = 72$, which is too big!

Try again.

$$24\overline{)708}\quad 2$$
$$48$$
$$228$$

Divide the 228 ones.

$$24\overline{)708}\quad 29$$
$$48$$
$$228$$
$$216$$
$$12$$

Think: $9 \times 20 = 180$

$708 \div 24 = 29$ R12

Round each dividend and divisor. Estimate each quotient. Then find the exact quotient.

1. $48\overline{)504}$ 10 R24 — 480, 24; $50\overline{)500}$ 10
2. $21\overline{)796}$ 37 R19 — 630, 166, 147, 19; $20\overline{)800}$ 40
3. $29\overline{)901}$ 31 R2 — 870, 31, 29, 2; $30\overline{)900}$ 30

Divide.

4. $32\overline{)924}$ 28 R28 — 640, 284, 256, 28
5. $16\overline{)678}$ 42 R6 — 640, 38, 32, 6
6. $48\overline{)3604}$ 75 R4 — 3360, 244, 240, 4

Find the Missing Prices.

Help the storekeeper by labelling each item. The bills are below each item.

Item	Total Cost
14 radios	$266

Item	Total Cost
37 books	$407

Item	Total Cost
80 hats	$2080

28 R28 10 R24

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Tenths, Hundredths, and Thousandths

Study the chart.

	ones	tenths	hundredths	thousandths	Word name
2.000	2	0	0	0	two ones or two
3.100	3	1	0	0	three and one tenth
0.240	0	2	4	0	twenty-four hundredths
25.016	25	0	1	6	twenty five and sixteen-thousandths

Write the name for each decimal.

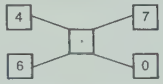
1. 0.5 five-tenths
2. 6.13 six and thirteen-hundredths
3. 0.015 fifteen-thousandths
4. 1.425 one and four hundred twenty-five thousandths

Write the decimal for each.

5. six-tenths 0.6
6. five-hundredths 0.05
7. five and thirty-two hundredths 5.32
8. twelve and sixteen-thousandths 12.016

Create-a-Decimal

Using the given digits and the decimal point, create a decimal that has each of the following. Do not repeat a digit in a problem.



Answers may vary

9. four in the tenths place 6.407
10. zero in the hundredths place 6.407
11. six in the ones place and zero in the tenths place 6.047
12. a decimal greater than 7 7.406
13. a decimal less than 1 0.647

5 tenths 0.6 5.32 15 thousandths

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Comparing Decimals

Which is larger, 126.746 or 126.7?
Rewrite 126.7 as 126.700 so that both decimals have the same number of digits.

Remember: Adding a zero at the end of a decimal does not change the value of the decimal.

Compare the digits.

hundreds	tens	ones	·	tenths	hundredths	thousandths
1	2	6	·	7	4	6
1	2	6	·	7	0	0
same	same	same		same	4 > 0	

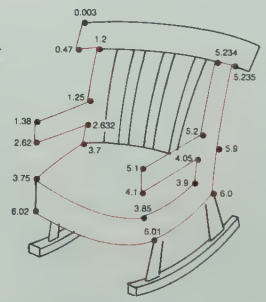
so, $126.746 > 126.7$

Write >, <, or = to make true statements.

1. 4.12 ≤ 4.13
2. 6.005 < 6.05
3. 7.396 > 7.369
4. 24.16 = 24.160
5. 0.008 > 0.010
6. 9.5 > 9.437
7. 10.001 < 10.010
8. 13.6 > 13.599
9. 153 = 153.000
10. 5.0 > 4.9
11. 10.011 > 9.998
12. 0.036 > 0.033

Decimal Dot-to-Dot

Connect the dots in order from least to greatest.



> =

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25

Adding Decimals

A salesman drove 31.7 km on Monday, 62.8 km on Tuesday, and 52.93 km on Wednesday. What was the total distance he travelled during these three days?

Add 31.7, 62.8, and 52.93.

Rewrite the decimals vertically. Remember to line up the decimal points.

Add the hundredths.	Add the tenths. Regroup.	Add the ones.	Add the tens. Regroup.
31.7 62.8 + 52.93 3	2 31.7 62.8 + 52.93 .43	2 31.7 62.8 + 52.93 7.43	2 31.7 62.8 + 52.93 147.43

The salesman drove 147.43 km.

Add.

1. 6.5 + 3.4 = 9.9
2. 4.6 + 0.9 = 5.5
3. 12.7 + 14.82 = 27.52
4. 25.83 + 36.42 = 62.25
5. 90.15 + 91.05 = 181.20
6. 5.4 + 4.3 + 8.2 = 17.9
7. 12.47 + 38.05 + 6.13 = 56.65
8. 14.8 + 16.007 + 13.05 = 43.857
9. 27.6 + 14.67 + 3.051 = 45.321
10. 0.72 + 0.8 + 1.09 = 2.61
11. 12.1 + 13.57 + 6.009 + 0.52 = 32.199

Special Sums

Add across and down. Then find the sum in the corner box.

+ → / ↓			
	1.43	3.8	5.23
	2.475	0.12	2.595
	3.905	3.92	7.825

+ → / ↓			
	4.6	0.32	4.92
	0.9	15.1	16.0
	5.5	15.42	20.92

9.9 32.199 17.9

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Subtracting Decimals

Subtract 2.413 from 3.

Rewrite 3 as 3.000, so that both decimals have the same number of places.	Regroup.	Subtract.
3.000 − 2.413	2 9 9 10 3.0 0 0 − 2.413	2 9 9 10 3.0 0 0 − 2.413 0.587

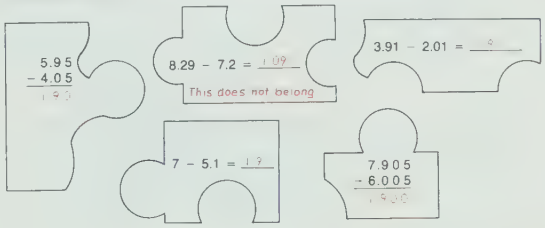
The difference is 0.587.

Subtract. Add to check.

1. 6.7 − 4.2 = 2.5 (check: 2.5 + 4.2 = 6.7)
2. 10.89 − 7.96 = 2.93 (check: 2.93 + 7.96 = 10.89)
3. 6.07 − 5.70 = 0.37 (check: 0.37 + 5.70 = 6.07)
4. 12.34 − 7 = 5.34
5. 4 − 0.005 = 3.995
6. Jane took $20 to the grocery store. She spent $14.86.
   How much change did she receive? $5.14

It's a Puzzle

One puzzle piece does not belong with the other four. Which one is it?
Subtract to find out.



$5.14 2.5, 2.5 5.34

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27

Rounding Decimals

Round 2.463 to the nearest one, tenth, and hundredth.

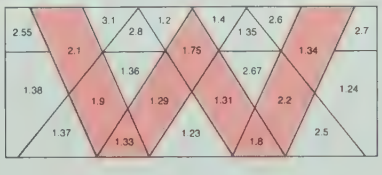
Round to the nearest	What is the digit to the right of the rounding place?	Is it 5 or more?	Round
one	4	no	down to 2
tenth	6	yes	up to 2.5
hundredth	3	no	down to 2.46

Complete the chart.

	Number	Round to the nearest one	tenth	hundredth
1.	3.354	3	3.4	3.35
2.	7.581	8	7.6	7.58
3.	3.905	4	3.9	3.91
4.	0.006	0	0.0	0.01
5.	12.455	12	12.5	12.46
6.	14.796	15	14.8	14.80
7.	22.298	22	22.3	22.30
8.	16.339	16	16.3	16.34

Hidden Letter

Shade all shapes whose numbers when rounded to the nearest whole number equal 2.
Shade all shapes whose numbers when rounded to the nearest tenth equal 1.3.



3.34, 3.35

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28

Estimating Sums and Differences

Estimate the sum of $14.95, $21.75, and $9.29. Round each number to the nearest one and add.

$14.95 → $15.00
21.75 → 22.00
+ 9.29 → + 10.00
$45.99 $47.00

The estimated sum is $47.00.
The exact sum is $45.99.

Estimate the difference of 0.937 and 0.456. Round each number to the nearest tenth and subtract.

0.937 → 0.9
− 0.456 → − 0.5
0.481 0.4

The estimated difference is 0.4.
The exact difference is 0.481.

When estimating, round all numbers greater than one to the nearest whole number. Round all numbers less than one to the nearest tenth unless otherwise indicated.

Estimate. Then find the exact sum or difference.

1. 9.3 + 6.5 + 8.7 = 24.5 (9 + 7 + 9 = 25)
2. $16.75 + 9.06 + 23.59 = $49.40 ($17.00 + 9.00 + $24.00 = $50.00)
3. 0.846 + 0.732 + 0.696 = 2.274 (0.8 + 0.7 + 0.7 = 2.2)
4. 86.9 − 47.5 = 39.4 (87 − 48 = 39)
5. 6.49 − 6.01 = 0.48 (6 − 6 = 0)
6. 8.000 − 5.324 = 2.676 (8 − 5 = 3)

Unscramble the Letters

Estimate. Use your estimate to pick the exact answer in the code.
Place the letter of the problem under the exact answer.

1.5	6.2	2.637	2.637	2.33	1.5	4.7
C	O	R	R	E	C	T

R. 3.875 − 1.238 = 3 (4 − 1 = 3)

T. 1.2 + 1.6 + 1.9 = 5 (1 + 2 + 2 = 5)

O. 86.05 − 79.85 = 6 (86 − 80 = 6)

C. 0.096 + 0.998 + 0.375 = 1.5 (0.1 + 1.0 + 0.4 = 1.5)

E. 12 − 9.67 = 2 (12 − 10 = 2)

24.5, 25 39.4, 39

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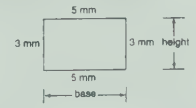
29

Using a Rule to Find Perimeter

Find the perimeter of the rectangle.



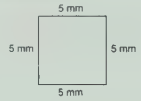
$3 + 5 + 3 + 5 = 16$
or $(2 \times 3) + (2 \times 5) = 16$
The perimeter is 16 mm.

We can use this rule:

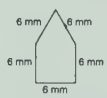
Perimeter of ▭ rectangle = (2 × base) + (2 × height).

Find the perimeter of these regular polygons.

$4 + 4 + 4$
or $3 \times 4 = 12$
P = 12 mm



$5 + 5 + 5 + 5$
or $4 \times 5 = 20$
P = 20 mm



$6 + 6 + 6 + 6 + 6$
or $5 \times 6 = 30$
P = 30 mm

We can use this rule:

Perimeter of regular polygon = length of one side × number of sides.

Find the perimeter of each figure.

1.

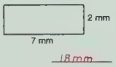
12 mm

2.

36mm

3.

20mm

4. 

18mm

The perimeter of each regular polygon is given. Find the length of one side of each polygon.

5.

10mm

6.

6mm

7.

16mm

10 mm 12 mm

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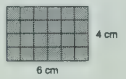
30

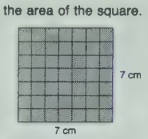
Using a Rule to Find Area

Find the area of the rectangle.



We can count 24 boxes or multiply.
base × height
$6 \times 4 = 24$
Area = 24 cm²

Find the area of the square.



We can count 49 boxes or multiply.
side × side
$7 \times 7 = 49$
Area = 49 cm²

Area of a rectangle = base × height.
Area of a square = side × side.

Find the area of each figure.

1.

16mm²

2.

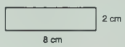
27mm²

3.

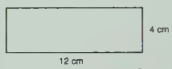
40mm²

4.

36cm²

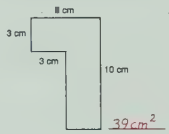
5. 

16cm²

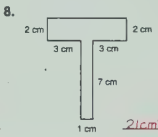
6. 

48cm²

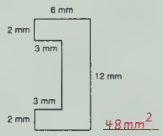
Find the area of each figure. Hint: draw lines to divide each figure into rectangles or squares.

7. 

39cm²

8. 

21cm²

9. 

48mm²

36 cm² 16 mm² 39 cm²

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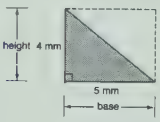
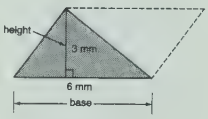
Finding the Area of a Triangle

Find the area of these triangles.



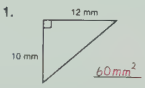
Area of the rectangle
= 5 mm × 4 mm
= 20 mm²
Since the triangle is half the rectangle, its area is 10 mm².



Area of the parallelogram
= 6 mm × 3 mm
= 18 mm²
Since the triangle is half the parallelogram, its area is 9 mm².

Area of a triangle = $\frac{\text{base} \times \text{height}}{2}$

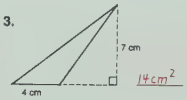
Find the area of each triangle.

1. 

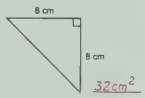
60mm²

2.

44mm²

3. 

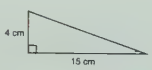
14cm²

4. 

32cm²

5.

30cm²

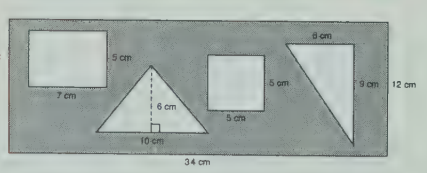
6. 

30cm²

Find the area of the shaded region.

Area of large rectangle
408 cm²
Area of inside figures
= 35 + 30 + 25 + 27
= 117 cm²

408
− 117
291 cm²



32 cm² 60 mm²

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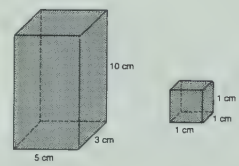
32

Finding the Volume of a Rectangular Prism

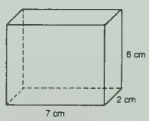
How many centimetre cubes can fit in the box?
Find the volume.



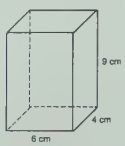
The area of the base is 5 cm × 3 cm or 15 cm².
Area of the base × height of the box = 15 cm² × 10 cm = 150 cm³
150 cubic centimetres can fit into the box. The volume is 150 cm³.

Volume of a rectangular prism = Area of the base × height.

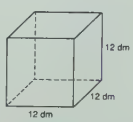
Find the volume of each rectangular prism.

1. 

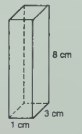
84cm³

2. 

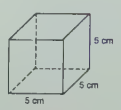
216 cm³

3. 

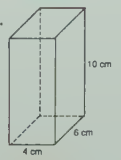
1728 cm³

4. 

24 cm³

5. 

125 cm³

6. 

240 cm³

24 cm² 84 cm²

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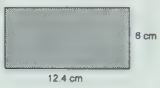
Multiplying Decimals and Whole Numbers

Find the area of a rectangle whose base is 12.4 cm and whose height is 6 cm.



Multiply 12.4 × 6.

Multiply.	Place the decimal point.
1 2 1 2 4 × 6 7 4 4	1 2.4 ← 1 decimal place × 6 ← + 0 decimal places 7 4.4 ← 1 decimal place

The area of the rectangle is 74.4 cm².

Multiply.

1. 7.3 × 4 = 29.2
2. 18.7 × 6 = 112.2
3. 9.25 × 2 = 18.50
4. $12.45 × 3 = $37.35

5. 6.7 × 32 = 214
6. 12.52 × 13 = 162.76
7. 5.396 × 6 = 37.772
8. 2.091 × 45 = 94.095

9. A runner jogs 3.5 km in one day. How many kilometres does she jog in one week? 24.5 km

Here is a code.

27.6	18.5	54.84	10.05	50.6	35.6
R	F	C	I	T	E

What is the message? Multiply.

4.6 × 11	8.9 × 4	0.2 × 3	4.6 × 6	1.005 × 10	3.7 × 5	2.01 × 5	4.57 × 12
50.6	35.6	27.6	27.6	10.05	18.5	10.05	54.84
T	E	R	R	I	F	I	C

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Multiplying Tenths

Multiply 4.7 and 3.5.

Multiply by the tenths.	Multiply by the ones.	Add and place the decimal point.
3 4.7 × 3.5 2 3 5 ← 47 × 5	3 4.7 × 3.5 2 3 5 1 4 1 ← 47 × 3	3 4.7 ← 1 decimal place × 3.5 ← 1 decimal place 2 3 5 1 4 1 1 6.4 5 ← 2 decimal places

The product is 16.45.

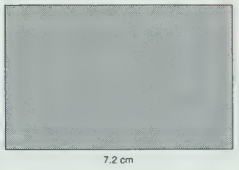
Place the decimal point in each product.

1. 3.2 × 1.5 = 480
2. 5.1 × 0.2 = 1.02
3. 15.7 × 4.3 = 6751
4. 62.5 × 14 = 8750

Multiply.

5. 6.3 × 1.7 = 10.71
6. 8.4 × 0.1 = 0.84
7. 19.5 × 2.5 = 48.75
8. 29.3 × 24 = 703.2

Find the area and perimeter of this rectangle.



A = base × height
A = 4.6 × 7.2 = 33.12 cm²
P = (base × 2) + (height × 2)
P = (4.6 × 2) + (7.2 × 2) = 23.6 cm

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Two Decimal Factors, Products Less Than 1

A rectangular shelf is 0.62 m long and 0.5 m wide. How much paper is needed to cover the top of the shelf?

Multiply 0.62 × 0.5.

Multiply by the tenths.	Place the decimal point.
1 0.6 2 × 0.5 ← 62 × 5 0 3 1 0	1 0.6 2 ← 2 decimal places × 0.5 ← + 1 decimal place 0.3 1 0 ← 3 decimal places

0.310 m² of paper will be needed.

Place the decimal point in each product.

1. 0.44 × 0.3 = 0.132
2. 0.34 × 0.56 = 0.1984
3. 0.75 × 0.02 = 0.0150
4. .005 × 0.3 = 0.0015

Multiply

5. 0.9 × 0.6 = 0.54
6. 0.42 × 0.01 = 0.0042
7. 0.73 × 0.22 = 0.1606
8. 0.096 × 0.09 = 0.00864

9. Apples cost $150/kg. How much will 0.74 kg cost? $111
10. Grapes cost $3.89/kg. How much will 0.5 kg cost? $1.95

Here is a code.

0.0153	0.3653	0.12	0.06	0.014	0.0067
D	W	K	G	R	O

What is the message? Multiply.

0.3 × 0.2	0.67 × 0.01	0.067 × .10	0.51 × 0.03	0.09 × 4.07	0.134 × 0.05	0.07 × 0.2	0.4 × 0.3
0.06	0.0067	0.0067	0.0153	0.3663	0.0067	0.014	0.12
6	O	O	D	W	O	R	K

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SPM 6 Masters With pages 146-147 36

Dividing by a One-Digit Number

Six bars of soap cost $1.62.
How much does each bar of soap cost?

Divide $1.62 by 6.

Divide 162 by 6.	Place the decimal point.
0 27 6) 1.62 1 2 42 42 0	0.27 6) 1.62 1 2 42 42 0

Each bar of soap costs $0.27.

Divide.

1. 5) 2.5 = 0.5
2. 7) 4.9 = 0.7
3. 4) 1.64 = 0.41
4. 6) 0.006 = 0.001

5. 2) 12.64 = 6.32
6. 8) 7.28 = 0.91
7. 9) 81.936 = 9.104
8. 3) 10.482 = 3.494

Circle the correct quotient. It is not necessary to do each division exercise.

	Problem	Quotients		
9.	3) 1.2	(0.40)	4.0	0.4
11.	7) 5.6	80	8	(0.8)
13.	2) 0.006	0.3	0.03	(0.003)

	Problem	Quotients		
10.	5) 0.05	10	0.1	(0.01)
12.	9) 81.72	9.8	(9.08)	0.908
14.	8) 0.648	(0.081)	0.81	0.801

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Dividing by a Two-Digit Number

Divide 156.5 by 25.

Divide 156.5 by 25.

$$25 \overline{)156.5}$$

6

150 ← 6 × 25

6 5

Place the decimal point and divide 65 by 25.

$$25 \overline{)156.5}$$

6.2

150

6 5

5 0 ← 2 × 25

1 5

Add a zero and continue dividing.

$$25 \overline{)156.50}$$

6.26 (Remember 0.5 = 0.50)

150

6 5

5 0

1 50

1 50 ← 6 × 25

0

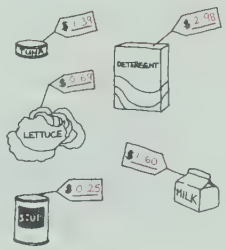
156.5 divided by 25 is 6.26.

Divide. Add zeros when necessary.

1. $12 \overline{)37.2}$ → 3.1; 360; 12; 12; 0
2. $16 \overline{)4.16}$ → 0.26; 320; 96; 96; 0
3. $24 \overline{)112.8}$ → 4.7; 96 0; 168; 168; 0
4. $16 \overline{)80.32}$ → 5.02; 80.00; 32; 32; 0

Use the bill to find the unit cost of each item. Then, total the bill.

Quantity	Item	Cost
12	cans of tuna	$16.68
26	boxes of detergent	$77.48
13	heads of lettuce	$ 8.97
30	containers of milk	$48.00
43	cans of soup	$10.75
	Total	$161.88



3.1

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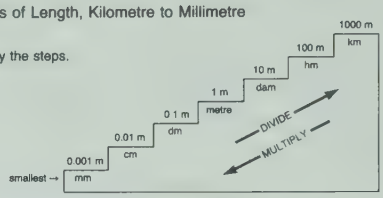
Units of Length, Kilometre to Millimetre

Study the steps.



Each step names a unit of length and its relationship to the metre.

We can change from one unit to another.

> Smaller → Larger: Divide by 10 for each step up.
> Larger → Smaller: Multiply by 10 for each step down.

3 m = 3000 cm (3 × 10 × 10; dm cm)

6000 m = 6 km (6000 ÷ 10 ÷ 10 ÷ 10; dam hm km)

Complete.

1. 4 m = 400 cm
2. 5000 mm = 5 m
3. 12 km = 12 000 m
4. 620 cm = 6.2 m
5. 47 dm = 4.7 m
6. 150 hm = 15 000 m
7. 14 m = 1400 cm
8. 14 m = 1.4 dam
9. 14 m = 14 000 mm
10. 0.04 m = 4 cm
11. 60 m = 0.06 km
12. 5.8 m = 5800 mm

Circle the longest length.

13. 5 mm, 5 cm, (5 m)
14. (6 km), 50 hm, 4000 m
15. 12 mm, (5 cm), 0.03 m

Match each item with the unit of length that you would use to measure it.

length of couch	millimetre
thickness of a piece of cardboard	centimetre
length of your thumb	metre
distance between Ottawa and Montreal	kilometre

1400 6.2 400 5 m 4

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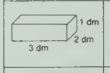
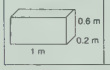
Volume, Capacity, and Mass

Find the volume, capacity, and mass of water for each container.

	Volume	Capacity	Mass	Relationships to Remember
	8 cm³	8 mL (or 0.008 L)	8 g (or 0.008 kg)	1 cm³ —capacity→ 1 mL; 1 mL —mass→ 1 g
	6 dm³	6 L (or 6000 mL)	6 kg (or 6000 g)	1 dm³ —capacity→ 1 L; 1 L —mass→ 1 kg
	0.12 m³	0.12 kL (or 120 L)	0.12 t (or 120 kg)	1 m³ —capacity→ 1 kL; 1 kL —mass→ 1 t

Complete the table.

	Volume	Capacity	Mass of water
1.	5 cm³	5 mL	5 g
2.	10 dm³	10 L or 10 000 mL	10 kg or 10 000 g
3.	160 cm³	160 mL or 0.160 L	160 g
4.	1200 cm³	1200 mL or 1.2 L	1200 g
5.	0.6 m³	0.6 kL	0.6 t or 600 kg
6.	22 dm³	22 L	22 kg
7.	4.6 dm³	4.6 L or 4600 mL	4.6 kg
8.	3 dm²	3000 mL	3000 g

Match each item with the unit of measurement you would use to measure it.

child's wading pool	grams
mass of an orange	kilograms
can of orange juice	millilitres
mass of a desk	litres

5 mL, 5 g

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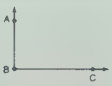
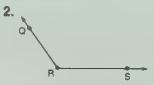
Angles

Study the chart.

	Angle name	Vertex	Type of angle
	∠RST	S	acute—greater than 0° and less than 90°
	∠ABC	B	straight—equal to 180°
	∠XYZ	Y	obtuse—greater than 90° and less than 180°
	∠MNO	N	right—equal to 90°

Measure each angle, name it, and classify it.

1.  90°, ∠ABC, right
2.  125°, ∠QRS, obtuse
3. 87°, ∠RST, acute
4. 35°, ∠XYZ, acute
5. 180°, ∠EFG, straight
6. 100°, ∠KLM, obtuse

Using a protractor, draw each angle on the back of this page.

7. 62°
8. 138°
9. 12°

35° 90°

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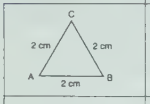
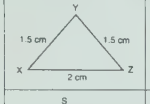
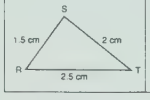
Triangles and Circles

Study the chart.

	Name of triangle	Length of each side	Type of triangle
	∠ABC	2 cm each	equilateral— 3 equal sides
	∠XYZ	1.5 cm, 1.5 cm, 2 cm	isosceles— 2 equal sides
	∠RST	1.5 cm, 2.5 cm, 3 cm	scalene— no equal sides

For each triangle, measure the sides and classify the triangle according to the length of the sides.

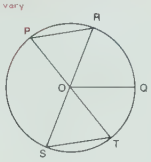
1.
3cm each, equilateral

2.
2cm, 2cm, 2.8cm, isosceles

3.
3cm, 1.5cm, 4cm, scalene

Use the circle at the right. Answers will vary

4. Name a radius. $\overline{OS}$
5. Measure a radius. 3cm
6. Name a diameter. $\overline{RS}$
7. Measure a diameter. 6cm
8. Name a chord. $\overline{ST}$



3 cm, equilateral

$\overline{OS}$, $\overline{OP}$, $\overline{OQ}$, $\overline{OT}$, $\overline{OR}$

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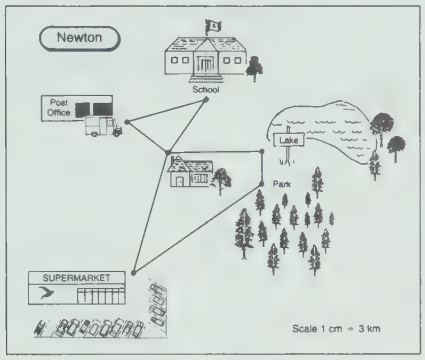
Scale Drawings

Study the map of Newton, showing Jane Lauson's house.



Complete the chart. Measure the lines to find each distance. Then use the scale to find the real distances. The first one is done for you.

		Distance on the map	Real distance
1.	Jane's house to lake	3 cm	9 km (3 × 3 = 9)
2.	Jane's house to school	2 cm	6 km
3.	school to post office	2.5 cm	7.5 km
4.	lake to park	1 cm	3 km
5.	house to supermarket	4 cm	12 km
6.	park to supermarket	5 cm	15 km
7.	post office to house	1.5 cm	4.5 km

2 cm, 6 km

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Factors, Common Factors, and Greatest Common Factors

Find the greatest common factor of 12 and 18.

Factors of 12	Factors of 18
2 × 6	2 × 9
3 × 4	3 × 6
12 × 1	18 × 1
The factors of 12 are 1, 2, 3, 4, 6, and 12.	The factors of 18 are 1, 2, 3, 6, 9, and 18.

The common factors are 1, 2, 3, and 6.
The greatest common factor is 6.

Write the factors for each number.

1. 8 1, 2, 4, 8
2. 24 1, 2, 3, 4, 6, 8, 12, 24
3. 20 1, 2, 4, 5, 10, 20
4. 30 1, 2, 3, 5, 6, 10, 15, 30
5. 25 1, 5, 25
6. 50 1, 2, 5, 10, 25, 50
7. 7 1, 7
8. 60 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
9. 48 1, 2, 3, 4, 6, 8, 12, 16, 24, 48

Magic Square

Find the greatest common factor for each pair. Write the answer in the correct box. The result will form a magic square. Add each row and column and the diagonal. The sums will all be equal.

A. 24, 32
B. 9, 11
C. 36, 42
D. 3, 18
E. 15, 25
F. 21, 28
G. 16, 20
H. 72, 81
I. 18, 100

A 8	D 3	G 4	15
B 1	E 5	H 9	15
C 6	F 7	I 2	15
15	15	15	15

1, 2, 4, 8

1, 2, 3, 4, 6, 8, 12, 16, 24, 48

1, 5, 25

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Multiplying or Dividing to Find Equivalent Fractions

Karen ate $\frac{1}{2}$ of a pie. Carmen ate $\frac{3}{6}$ of a pie of the same size. Who ate more?

The two girls ate the same amount of pie. $\frac{1}{2}$ and $\frac{3}{6}$ are equivalent fractions because they name the same amount.

We can find equivalent fractions by multiplying or dividing.

Multiply the numerator and the denominator by the same number.

$\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$

Divide the numerator and the denominator by their greatest common factor.

$\frac{3}{6} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$ This is in lowest terms.

Using multiplication, find 3 equivalent fractions for each. Answers may vary

1. $\frac{1}{2}$ $\frac{2}{4}, \frac{3}{6}, \frac{4}{8}$
2. $\frac{3}{4}$ $\frac{6}{8}, \frac{9}{12}, \frac{15}{20}$
3. $\frac{4}{5}$ $\frac{8}{10}, \frac{16}{20}, \frac{28}{30}$
4. $\frac{9}{10}$ $\frac{90}{100}, \frac{18}{20}, \frac{27}{30}$
5. $\frac{5}{7}$ $\frac{10}{14}, \frac{15}{21}, \frac{20}{28}$
6. $\frac{8}{11}$ $\frac{16}{22}, \frac{24}{33}, \frac{88}{121}$

Reduce each fraction to lowest terms.

7. $\frac{7}{14}$ $\frac{1}{2}$
8. $\frac{9}{27}$ $\frac{1}{3}$
9. $\frac{20}{30}$ $\frac{2}{3}$
10. $\frac{16}{64}$ $\frac{1}{4}$
11. $\frac{24}{36}$ $\frac{2}{3}$
12. $\frac{25}{35}$ $\frac{5}{7}$
13. $\frac{12}{18}$ $\frac{2}{3}$
14. $\frac{28}{50}$ $\frac{14}{25}$

In each row there are 3 equivalent fractions. Circle them.

15. $(\frac{3}{4})$ $(\frac{18}{24})$ $(\frac{9}{12})$ $\frac{9}{16}$, $\frac{15}{21}$
16. $(\frac{5}{8})$ $\frac{10}{12}$, $(\frac{10}{16})$ $(\frac{25}{40})$ $\frac{30}{49}$
17. $(\frac{36}{80})$ $(\frac{9}{20})$ $\frac{12}{27}$, $\frac{6}{20}$, $(\frac{18}{40})$
18. $\frac{20}{40}$, $(\frac{15}{18})$ $(\frac{25}{30})$ $(\frac{5}{6})$ $\frac{30}{50}$

$\frac{1}{2}$ $\frac{3}{4}$, $\frac{18}{24}$, $\frac{9}{12}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{18}{20}$, $\frac{27}{30}$, $\frac{90}{100}$

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Multiples, Common Multiples, and Least Common Multiples

Write the fractions $\frac{5}{12}$ and $\frac{7}{18}$ as equivalent fractions with like denominators.

Find the least common multiple of the denominators.

12 ... Multiples are 12, 24, 36, 48, 60, 72, etc.

18 ... Multiples are 18, 36, 54, 72, 90, etc.

The least common multiple is 36.

Use 36 as the common denominator.

$\frac{5}{12} = \frac{5 \times 3}{12 \times 3} = \frac{15}{36}$ $\quad$ $\frac{7}{18} = \frac{7 \times 2}{18 \times 2} = \frac{14}{36}$

$\frac{15}{36}$ is equivalent to $\frac{5}{12}$, and $\frac{14}{36}$ is equivalent to $\frac{7}{18}$.

Find the least common multiple for each pair of numbers.

1. 4, 8 — 8
2. 7, 21 — 21
3. 20, 30 — 60
4. 9, 7 — 63
5. 24, 36 — 72
6. 15, 25 — 75

Find equivalent fractions with like denominators.

7. $\frac{3}{4}, \frac{1}{8}$ — $\frac{6}{8}, \frac{1}{8}$
8. $\frac{7}{16}, \frac{3}{24}$ — $\frac{21}{48}, \frac{6}{48}$
9. $\frac{4}{30}, \frac{1}{18}$ — $\frac{12}{90}, \frac{5}{90}$
10. $\frac{5}{7}, \frac{4}{11}$ — $\frac{55}{77}, \frac{28}{77}$
11. $\frac{2}{15}, \frac{1}{25}$ — $\frac{10}{75}, \frac{3}{75}$
12. $\frac{8}{9}, \frac{5}{12}$ — $\frac{32}{36}, \frac{15}{36}$

Mystery Fractions

For each pair of fractions, write equivalent fractions with the same denominator. Cross out each new fraction in the fraction strip. The 2 fractions remaining are the mystery fractions. They are also equivalent.

~~24/90~~	~~35/90~~	4/30	~~15/90~~	~~15/90~~	~~18/90~~	~~9/90~~	~~8/90~~	~~20/90~~	12/90

13. $\frac{4}{5}, \frac{3}{6}$ — $\frac{24}{30}, \frac{15}{30}$
14. $\frac{3}{10}, \frac{2}{3}$ — $\frac{9}{30}, \frac{20}{30}$
15. $\frac{1}{4}, \frac{2}{15}$ — $\frac{15}{60}, \frac{8}{60}$
16. $\frac{7}{18}, \frac{3}{15}$ — $\frac{35}{90}, \frac{18}{90}$

$\frac{4}{30}$ and $\frac{12}{90}$ are the mystery fractions.

$\frac{8}{1}, \frac{8}{9}$ $\quad$ 8 $\quad$ $\frac{77}{55}, \frac{28}{77}$ $\quad$ 63

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Adding and Subtracting with Like Denominators

A pie is cut into 10 equal slices.

Joe ate $\frac{4}{10}$ of the pie and Judy ate $\frac{3}{10}$ of the pie.

How much of the pie did they eat altogether?

Add.

Judy $\frac{3}{10}$ + Joe $\frac{4}{10}$ = $\frac{7}{10}$

They ate $\frac{7}{10}$ of the pie.

How much of the pie was left over?

Subtract.

1 whole pie $\frac{10}{10}$ − part eaten $\frac{7}{10}$ = $\frac{3}{10}$

$\frac{3}{10}$ of the pie was left over.

Add.

1. $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$
2. $\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$
3. $1\frac{1}{4} + 2\frac{1}{4} = 3\frac{2}{4}$
4. $8\frac{3}{7} + 1\frac{2}{7} = 9\frac{5}{7}$

Subtract.

5. $\frac{7}{20} - \frac{3}{20} = \frac{4}{20}$
6. $\frac{13}{15} - \frac{6}{15} = \frac{7}{15}$
7. $12\frac{7}{24} - 9\frac{5}{24} = 3\frac{2}{24}$
8. $36\frac{21}{50} - 19\frac{16}{50} = 17\frac{5}{50}$

Complete the squares to make true sentences.

9. $5\frac{6}{8} + 3\frac{1}{8} = 8\frac{7}{8}$
10. $20\frac{9}{12} - 8\frac{4}{12} = 12\frac{18}{24}$
11. $6\frac{4}{15} + \frac{3}{15} = 6\frac{7}{15}$
12. $\frac{12}{25}$ (or $\frac{24}{25}$) $- 13\frac{11}{25} = 9\frac{1}{25}$

$\frac{4}{20}$ $\quad$ $\frac{3}{5}$ $\quad$ 9

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Adding Fractions with Unlike Denominators

Add $\frac{1}{4}$ and $\frac{1}{8}$.

Rewrite $\frac{1}{4}$ as an equivalent fraction with denominator of 8.

Rewrite. $\frac{1}{4} = \frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$

Add. $\frac{2}{8} + \frac{1}{8} = \frac{3}{8}$

We can add fractions if their denominators are the same.

Add $\frac{1}{4}$ and $\frac{1}{3}$.

The least common multiple of 4 and 3 is 12.

Rewrite. $\frac{1}{4} = \frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$

$\frac{1}{3} = \frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$

Add. $\frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

Add. Express each sum in lowest terms.

1. $\frac{2}{3} + \frac{1}{6} = \frac{5}{6}$
2. $\frac{5}{12} + \frac{7}{24} = \frac{17}{24}$
3. $\frac{3}{8} + \frac{5}{16} = \frac{11}{16}$
4. $\frac{5}{27} + \frac{2}{9} = \frac{11}{27}$
5. $\frac{1}{3} + \frac{1}{5} = \frac{8}{15}$
6. $\frac{3}{8} + \frac{1}{3} = \frac{17}{24}$
7. $\frac{5}{6} + \frac{3}{5} = \frac{43}{30}$
8. $\frac{3}{20} + \frac{9}{30} = \frac{27}{60} = \frac{9}{20}$
9. Bill, Tom, and Mrs. Gray helped Mr. Gray paint the fence. Bill painted $\frac{3}{8}$ of the fence, Tom painted $\frac{1}{6}$ of the fence and Mrs. Gray painted $\frac{1}{12}$ of the fence. What part of the fence did the three of them paint altogether? $\frac{5}{8}$

Here is a code.

$\frac{31}{40}$	$\frac{7}{36}$	$\frac{29}{75}$	$\frac{7}{9}$	$\frac{5}{12}$
T	E	C	A	H

With what animal should you not play cards? Add to answer the riddle.

$\frac{1}{9} + \frac{2}{3} = \frac{7}{9}$	$\frac{3}{25} + \frac{4}{15} = \frac{29}{75}$	$\frac{1}{4} + \frac{1}{6} = \frac{5}{12}$	$\frac{1}{6} + \frac{1}{36} = \frac{7}{36}$	$\frac{1}{12} + \frac{1}{9} = \frac{7}{36}$	$\frac{3}{8} + \frac{2}{5} = \frac{31}{40}$	$\frac{1}{3} + \frac{4}{9} = \frac{7}{9}$	$\frac{1}{12} + \frac{1}{3} = \frac{5}{12}$
A	C	H	E	E	T	A	H

$\frac{15}{8}$ $\quad$ $\frac{8}{5}$ $\quad$ $\frac{8}{5}$

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Adding Fractions, Regrouping

Marta baby-sat for $3\frac{1}{2}$ h on Saturday and $2\frac{1}{3}$ h on Sunday. Jane baby-sat for $4\frac{3}{4}$ h on Saturday and $2\frac{1}{2}$ h on Sunday. Find each girl's total time.

Marta

$3\frac{1}{2} = 3\frac{3}{6}$

$2\frac{1}{3} = 2\frac{2}{6}$

$5\frac{5}{6}$

sum of the whole numbers

sum of the fractions

Jane

$4\frac{3}{4} = 4\frac{3}{4}$

$2\frac{1}{2} = 2\frac{2}{4}$

$6\frac{5}{4}$

improper fraction $\frac{5}{4} = 1\frac{1}{4}$

so, $6\frac{5}{4} = 6 + 1\frac{1}{4} = 7\frac{1}{4}$

regroup

Marta's total is $5\frac{5}{6}$ h and Jane's total is $7\frac{1}{4}$ h.

Add. Regroup if necessary.

1. $8\frac{1}{8} + 3\frac{1}{4} = 11\frac{3}{8}$
2. $1\frac{2}{3} + 2\frac{2}{3} = 3\frac{4}{3} = 4\frac{1}{3}$
3. $9\frac{1}{5} + 3\frac{1}{10} = 12\frac{3}{10}$
4. $9\frac{4}{5} + 3\frac{7}{10} = 12\frac{15}{10} = 13\frac{5}{10} = 13\frac{1}{2}$
5. $1\frac{5}{6} + 2\frac{5}{9} = 3\frac{25}{18} = 4\frac{7}{18}$
6. $3\frac{1}{7} + 4\frac{6}{7} = 7\frac{7}{7} = 8$
7. $10\frac{5}{12} + \frac{3}{16} = 10\frac{29}{48}$
8. $\frac{7}{10} + \frac{13}{30} = \frac{34}{30} = 1\frac{4}{30} = 1\frac{2}{15}$

Complete the wheel. Add each number to the number in the centre.

$\frac{7}{16}$ $\quad$ $\frac{13}{8}$

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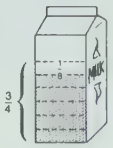
Subtracting Fractions with Unlike Denominators

A container of milk is $\frac{3}{4}$ full. Bob drank $\frac{1}{8}$ of the milk.
How full is the container?



Subtract. $\frac{3}{4} - \frac{1}{8}$

We could subtract if the denominators were the same.

Rewrite and subtract. $\frac{3}{4} \times 2 = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$ $\times 2$

The container is $\frac{5}{8}$ full.

Subtract. Reduce each difference to lowest terms.

1. $\frac{7}{8} - \frac{5}{8} = \frac{2}{8} = \frac{1}{4}$
2. $\frac{1}{2} = \frac{2}{4}$; $\frac{2}{4} - \frac{1}{4} = \frac{1}{4}$
3. $\frac{4}{9} = \frac{4}{9}$; $\frac{4}{9} - \frac{1}{3} = \frac{4}{9} - \frac{3}{9} = \frac{1}{9}$
4. $\frac{7}{20} - \frac{1}{10} = \frac{7}{20} - \frac{2}{20} = \frac{5}{20} = \frac{1}{4}$
5. $\frac{4}{5} = \frac{24}{30}$; $\frac{24}{30} - \frac{5}{30} = \frac{19}{30}$
6. $\frac{3}{8} = \frac{9}{24}$; $\frac{9}{24} - \frac{6}{24} = \frac{3}{24} = \frac{1}{8}$
7. $\frac{7}{10} = \frac{35}{50}$; $\frac{35}{50} - \frac{6}{50} = \frac{29}{50}$
8. $\frac{11}{30} = \frac{22}{60}$; $\frac{22}{60} - \frac{1}{4} = \frac{22}{60} - \frac{15}{60} = \frac{7}{60}$

Follow the two paths. How do the results compare?

Start $\frac{5}{8}$ → Subtract $\frac{3}{16}$. → $\frac{7}{16}$ → Subtract $\frac{5}{12}$. → $\frac{1}{48}$ → Add $\frac{35}{48}$. → $\frac{36}{48}$ → Add $\frac{1}{4}$. → $\frac{48}{48} = 1$

Start $\frac{5}{8}$ → Add $\frac{1}{4}$. → $\frac{7}{8}$ → Subtract $\frac{3}{16}$. → $\frac{11}{16}$ → Subtract $\frac{5}{12}$. → $\frac{13}{48}$ → Add $\frac{35}{48}$. → $\frac{48}{48} = 1$

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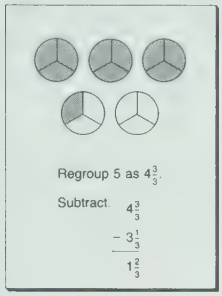
Subtracting Fractions, Regrouping

$5 - 3\frac{1}{3}$



Regroup 5 as $4\frac{3}{3}$.

Subtract. $4\frac{3}{3} - 3\frac{1}{3} = 1\frac{2}{3}$

$3\frac{1}{3} - 2\frac{1}{2}$

Find a common denominator.

$\frac{1}{3} = \frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$; $3\frac{1}{3} = 3\frac{2}{6}$

$\frac{1}{2} = \frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$; $2\frac{1}{2} = 2\frac{3}{6}$

Regroup $3\frac{2}{6}$ as $2\frac{8}{6}$.

Subtract. $2\frac{8}{6} - 2\frac{3}{6} = \frac{5}{6}$

Subtract. Reduce each answer to lowest terms.

1. $6 - 4\frac{1}{2} = 1\frac{1}{2}$
2. $9 - 5\frac{3}{5} = 3\frac{2}{5}$
3. $2\frac{3}{4} - \frac{1}{8} = 2\frac{5}{8}$
4. $4\frac{1}{2} - 3\frac{3}{4} = \frac{3}{4}$
5. $8\frac{9}{10} - 4\frac{2}{5} = 4\frac{5}{10} = 4\frac{1}{2}$
6. $7\frac{5}{12} - 5\frac{3}{8} = 2\frac{1}{24}$
7. $5\frac{3}{7} - 4\frac{9}{14} = \frac{11}{14}$
8. $10 - \frac{3}{18} = 9\frac{15}{18} = 9\frac{5}{6}$

9. Carl needs $3\frac{1}{3}$ cups of flour for a bread he is baking. He only has $2\frac{1}{2}$ cups. How much more flour does he need? $1\frac{1}{12}$ cups

10. Annette has two different recipes for tomato sauce. One recipe calls for 5 cups of tomatoes. The other recipe calls for $3\frac{2}{3}$ cups of tomatoes. How many more cups of tomatoes are needed for the first recipe than the second? $1\frac{1}{3}$ cups

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Multiplying Fractions

There is $\frac{1}{2}$ of a pie in Ellen's refrigerator.
Ellen cut the half pie into thirds. She ate $\frac{1}{3}$.
How much of the whole pie did she eat?

To find $\frac{1}{3}$ of $\frac{1}{2}$, multiply.

$\frac{1}{3} \times \frac{1}{2} = \frac{1 \times 1}{3 \times 2} = \frac{1}{6}$

Ellen ate $\frac{1}{6}$ of the whole pie.

Multiply. Reduce each product to lowest terms.

1. $\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$
2. $\frac{1}{4} \times \frac{2}{5} = \frac{2}{20} = \frac{1}{10}$
3. $\frac{3}{10} \times \frac{7}{8} = \frac{21}{80}$
4. $\frac{2}{5} \times \frac{1}{5} = \frac{2}{25}$
5. $\frac{1}{9} \times 18 = \frac{2}{1} = 2$
6. $10 \times \frac{4}{5} = \frac{40}{5} = 8$
7. $\frac{4}{7} \times \frac{4}{7} = \frac{16}{49}$
8. $\frac{1}{6} \times \frac{5}{12} = \frac{5}{72}$

9. Claude's math class met for $\frac{3}{4}$ of an hour. $\frac{1}{4}$ of that time was spent reviewing homework. What part of an hour was spent on homework? $\frac{3}{16}$

Tick-Tack-Toe

Multiply. Find the row, column, or diagonal with three of the same products.

$\frac{5}{6} \times \frac{6}{15} = \frac{1}{3}$	$\frac{4}{7} \times \frac{7}{12} = \frac{1}{3}$	$8 \times \frac{1}{16} = \frac{1}{2}$
$\frac{1}{4} \times \frac{8}{8} = \frac{8}{32}$	$\frac{4}{7} \times \frac{7}{8} = \frac{1}{2}$	$\frac{3}{8} \times \frac{4}{8} = \frac{3}{16}$
$\frac{9}{10} \times \frac{5}{9} = \frac{1}{2}$	$\frac{1}{8} \times \frac{1}{8} = \frac{1}{64}$	$\frac{1}{8} \times 5 = \frac{5}{8}$

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Dividing Fractions

$2 \times \frac{1}{2} = \frac{2}{1} \times \frac{1}{2} = \frac{2}{2} = 1$

$\frac{5}{6} \times \frac{6}{5} = \frac{30}{30} = 1$

$3\frac{1}{4} \times \frac{4}{13} = \frac{13}{4} \times \frac{4}{13} = 1$

Each of these pairs of fractions has a product of 1. We call these pairs **reciprocals.**

We use reciprocals to divide fractions.

Divide 6 by $\frac{1}{2}$.

$6 \div \frac{1}{2} = 6 \times \frac{2}{1} = 12$

$\frac{1}{2}$ and $\frac{2}{1}$ are reciprocals.
Dividing by $\frac{1}{2}$ is the same as multiplying by 2.

Write the reciprocals.

1. $\frac{3}{4}$ $\frac{4}{3}$
2. 6 $\frac{1}{6}$
3. $3\frac{1}{8}$ $\frac{8}{25}$
4. $\frac{1}{5}$ $\frac{5}{1}$
5. $\frac{7}{11}$ $\frac{11}{7}$

Divide. Write all quotients in lowest terms.

6. $\frac{1}{8} \div \frac{1}{4} = \frac{1}{2} \times \frac{4}{1} = 2$
7. $\frac{3}{5} \div \frac{1}{5} = \frac{3}{5} \times \frac{5}{1} = 3$
8. $4 \div \frac{1}{3} = \frac{4}{1} \times \frac{3}{1} = 12$
9. $\frac{3}{10} \div \frac{6}{5} = \frac{3}{10} \times \frac{5}{6} = \frac{15}{60} = \frac{1}{4}$
10. $\frac{7}{36} \div \frac{1}{12} = \frac{7}{36} \times \frac{12}{1} = \frac{7}{3}$
11. $\frac{4}{9} \div \frac{4}{9} = \frac{4}{9} \times \frac{9}{4} = 1$
12. $\frac{4}{9} \div \frac{9}{4} = \frac{4}{9} \times \frac{4}{9} = \frac{16}{81}$
13. $1 \div \frac{3}{20} = \frac{1}{1} \times \frac{20}{3} = \frac{20}{3} = 6\frac{2}{3}$

14. Mrs. Cook has 3 kg of ground meat. Mrs. Cook uses $\frac{1}{8}$ of a kilogram for each hamburger she makes. How many hamburgers can she make with 3 kg? 24

Write +, −, ×, or ÷ to make true sentences.

15. $\frac{5}{8} \times \frac{3}{10} = \frac{3}{16}$
16. $\frac{5}{8} + \frac{3}{10} = \frac{37}{40}$
17. $\frac{5}{8} - \frac{3}{10} = \frac{25}{12}$
18. $\frac{5}{8} - \frac{3}{10} = \frac{13}{40}$

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Fractions and Their Equivalent Decimals

Compare $\frac{5}{8}$ and $\frac{3}{4}$.

Convert $\frac{5}{8}$ and $\frac{3}{4}$ to equivalent decimals.

$\frac{5}{8} = 5 \div 8 =$

$$8\overline{)5.000}\quad 0.625$$
$$\underline{4\,800}$$
$$200$$
$$\underline{160}$$
$$40$$
$$\underline{40}$$
$$0$$

$\frac{3}{4} = 3 \div 4 =$

$$4\overline{)3.00}\quad 0.75$$
$$\underline{2\,80}$$
$$20$$
$$\underline{20}$$
$$0$$

Now compare 0.625 and 0.75. We can write $0.75 > 0.625$.

Write >, <, or = to make true statements.

1. $\frac{1}{2}$ ___ $\frac{1}{3}$
2. $\frac{2}{5}$ ___ $\frac{1}{2}$
3. $\frac{5}{6}$ ___ $\frac{5}{8}$
4. $\frac{3}{4}$ ___ $\frac{7}{8}$
5. $\frac{5}{6}$ ___ $\frac{7}{8}$
6. $\frac{3}{8}$ ___ $\frac{1}{4}$
7. $\frac{4}{5}$ ___ $\frac{9}{10}$
8. $\frac{9}{10}$ ___ $\frac{7}{8}$
9. $\frac{3}{5}$ ___ $\frac{7}{10}$

Unscramble the Letters

Change each fraction to an equivalent decimal. Place the fractions in the strip in order from least to greatest. Then write the matching letter under each fraction to find the scrambled word.

E. $\frac{1}{2}$ 0.5 **L.** $\frac{5}{6}$ 0.83 **W.** $\frac{1}{8}$ 0.125 **N.** $\frac{3}{7}$ 0.42 **F.** $\frac{3}{4}$ 0.75

D. $\frac{4}{9}$ 0.44 **R.** $\frac{7}{10}$ 0.7 **O.** $\frac{3}{8}$ 0.375 **U.** $\frac{4}{5}$ 0.8

least → greatest

$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{7}$	$\frac{4}{9}$	$\frac{1}{2}$	$\frac{7}{10}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{5}{6}$
W	O	N	D	E	R	F	U	L

< > >

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Writing Ratios

There are 30 students in Mrs. Burton's class. 20 of them are girls and 10 are boys.

We can write the following ratios (comparisons).

Ratio of girls to boys.	Ratio of girls to total students.	Ratio of boys to total students.
20 to 10	20 to 30	10 to 30
or 20:10	or 20:30	or 10:30
or $\frac{20}{10}$	or $\frac{20}{30}$	or $\frac{10}{30}$

Write each ratio.

1. black socks to striped socks 1:2
2. white socks to striped socks 2:3
3. striped socks to all the socks 3:6
4. black socks to all the socks 1:6
5. white socks to all the socks 2:6

Write each ratio in three different ways.

6. black squares to all the squares 6 to 16, 6:16, $\frac{6}{16}$
7. striped squares to black squares 3 to 6, 3:6, $\frac{3}{6}$
8. white squares to all the squares 2 to 16, 2:16, $\frac{2}{16}$
9. white squares to dotted squares 2 to 5, 2:5, $\frac{2}{5}$
10. dotted squares to black squares 5 to 6, 5:6, $\frac{5}{6}$

$\frac{2}{1}$ 6 to 16, 6:16, $\frac{6}{16}$

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Finding Equivalent Ratios

There are 12 squares.
4 are shaded black. There are different ratios to describe the picture.

The ratio of black squares to white squares can be written

1:3 or 2:6 or 3:9 or 4:12.

We can find equivalent ratios by multiplying or dividing both numbers in a ratio by the same number.

$\frac{1}{3} \xrightarrow{\times 2} \frac{2}{6}$ $\frac{4}{12} \xrightarrow{\div 4} \frac{1}{3}$

Write 3 equivalent ratios for each ratio.

1. $\frac{1}{4}$ $\frac{2}{8}, \frac{3}{12}, \frac{4}{16}$
2. 2:5 4:10, 8:20, 16:40
3. 5:10 1:2, 10:20, 20:40

Write each ratio in simplest form.

4. $\frac{4}{16}$ $\frac{1}{4}$
5. $\frac{10}{25}$ $\frac{2}{5}$
6. 7:21 1:3

7. For every 7 girls in Cranbury School, there are 5 boys. Complete the table of equivalent ratios.

Girls	7	14	28	56	112	224
Boys	5	10	20	40	80	160

In each row, three of the ratios are equivalent. Circle the ratio that doesn't belong.

8.	3:2	(9:4)	6:4	30:20
9.	9:15	3:5	(18:36)	15:25
10.	(7:14)	14:20	28:40	7:10
11.	$\frac{5}{3}$	($\frac{25}{9}$)	$\frac{50}{30}$	$\frac{100}{60}$

$\frac{1}{4}$ $\frac{2}{8}, \frac{3}{12}, \frac{4}{16}$ 9:4

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Finding the Missing Term

In 3 boxes, there are 15 balls.

How many balls are in one box?

Write a ratio.

$\frac{\text{Number of boxes}}{\text{Number of balls}} = \frac{3}{15}$

Find an equivalent ratio for 1 box.

$\frac{3}{15} \xrightarrow{\div 3} \frac{1}{5} = \frac{\text{Number of boxes}}{\text{Number of balls}}$

There are 5 balls in one box.

Complete each equivalent ratio.

1. $\frac{3}{5} \xrightarrow{\times 2} \frac{6}{10}$
2. $\frac{4}{7} \xrightarrow{\times 5} \frac{20}{35}$
3. $\frac{24}{18} \xrightarrow{\div 6} \frac{4}{3}$
4. $\frac{40}{90} = \frac{4}{9}$
5. $\frac{25}{45} = \frac{50}{90}$
6. $\frac{2}{3} = \frac{8}{12}$
7. $\frac{1}{2} = \frac{7}{14}$
8. $\frac{5}{8} = \frac{20}{32}$
9. $\frac{25}{45} = \frac{5}{9}$

Find the missing side for each pair of similar figures.

10. 27 cm, 12 cm; 9 cm, 4 cm
11. 36 cm, 60 cm; 9 cm, 15 cm

12. Complete the table of equivalent ratios.

$\frac{2}{3}$	$\frac{6}{9}$	$\frac{10}{15}$	$\frac{12}{18}$	$\frac{16}{24}$	$\frac{20}{30}$

$\frac{6}{10}$ 4 7 4

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Finding Unit Rates

Mrs. Simon drove 400 km in 5 h.
What was her rate per hour?

Mrs. Simon drove at a rate of $\frac{400\text{ km}}{5\text{ h}}$.

To find her rate for one hour, find the missing term of the ratio.

$\frac{400}{5} = \frac{?}{1}$ $\quad \frac{400}{5} = \frac{80}{1}$ (400 ÷ 5, 5 ÷ 5)

Mrs. Simon drove at a rate of 80 km/h. Her unit rate is 80.

Find each unit rate.

1. 540 km in 6 h — 90 km/h
2. 45 mL in 9 s — 5 mL/s
3. 10 kg for 80 L — 0.125 kg/L
4. 1800 m in 120 s — 15 m/s
5. 8°C in 10 d — 0.8°C/d
6. 4860 L in 10 h — 486 L/h

Match each situation with the rate that describes it.

7. how fast you ride your bike — km/h
8. how fast to fill a bucket of water — L/min
9. how to use a scale on a map — cm/km
10. how far a car travels on a tank of gas — km/L

Who walked at the fastest rate?
Here is a list of distances walked by four boys and the times for each. Find each unit rate to tell which boy walked the fastest.

Name	Distance walked	Time	Unit rate
Ravinder	18 km	240 min	4.5 km/h
Paul	10 000 m	2 h	5 km/h
Steve	24 km	4 h	6 km/h
Victor	0.52 km	6 min	5.2 km/h

Steve walked the fastest

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Writing Percents

One hundred students voted in a school election.
This chart shows the results.

Candidate	Number of votes	Ratio	Fraction	Decimal	Percent
Steve	43 out of 100	43:100	$\frac{43}{100}$	0.43	43%
Lisa	35 out of 100	35:100	$\frac{35}{100}$	0.35	35%
Anna	13 out of 100	13:100	$\frac{13}{100}$	0.13	13%
René	9 out of 100	9:100	$\frac{9}{100}$	0.09	9%

Percent means out of 100. 43% can be written as $\frac{43}{100}$, 43:100, or 0.43

Using Steve's results as an example, complete the table.

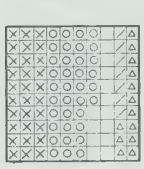
Write each as a percent.

1. 75 out of 100 — 75%
2. 10 out of 100 — 10%
3. 1 out of 100 — 1%
4. $\frac{35}{100}$ — 35%
5. $\frac{87}{100}$ — 87%
6. $\frac{3}{100}$ — 3%
7. 0.45 — 45%
8. 0.09 — 9%
9. 0.20 — 20%

Write each percent as a ratio.

10. 82% — 82:100
11. 20% — 20:100
12. 7% — 7:100

There are 100 boxes in the picture. Complete the table.



	Number	Ratio	Fraction	Decimal	Percent
X's	30	30:100	$\frac{30}{100}$	0.30	30%
O's	36	36:100	$\frac{36}{100}$	0.36	36%
/'s	7	7:100	$\frac{7}{100}$	0.07	7%
△'s	13	13:100	$\frac{13}{100}$	0.13	13%
blanks	14	14:100	$\frac{14}{100}$	0.14	14%

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Fractions and Decimals as Percents

There were 5 questions on Joe's test.
He got 4 of the questions correct.
What percent did he get correct?

Joe got $\frac{4}{5}$ of the questions correct.

Write $\frac{4}{5}$ as a decimal.

$5\overline{)4.00}$ (0.80, 4.00, 0) $\quad 0.08 = \frac{80}{100} = 80\%$

Joe got 80% of the questions correct.

Write each decimal as a percent.

1. 0.65 — 65%
2. 0.12 — 12%
3. 0.09 — 9%
4. 0.90 — 90%

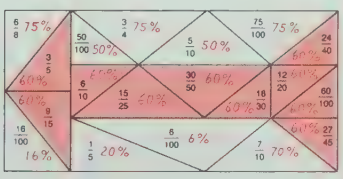
Write each fraction as a percent.

5. $\frac{53}{100}$ — 53%
6. $\frac{4}{100}$ — 4%
7. $\frac{3}{10}$ — 30%
8. $\frac{6}{20}$ — 30%
9. $\frac{7}{25}$ — 28%
10. $\frac{9}{50}$ — 18%
11. $\frac{4}{50}$ — 8%
12. $\frac{1}{25}$ — 4%
13. $\frac{1}{4}$ — 25%

Write each as a percent. Round each quotient to two digits.

14. $\frac{3}{8}$ — 38%
15. $\frac{7}{12}$ — 58%
16. $\frac{4}{9}$ — 44%

Write each fraction as a percent.
Shade all triangles that contain fractions equivalent to 60%.



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Percents as Decimals and Fractions

48% of the children attending Nicolet School arrive by school bus. What fraction of the children come by bus?

$48\% = 0.48 = \frac{48}{100} = \frac{12}{25}$

Rewrite 48% as a decimal and a fraction

Reduce to an equivalent fraction in lowest terms

$\frac{12}{25}$ of the children come by bus.

Write each percent as a decimal.

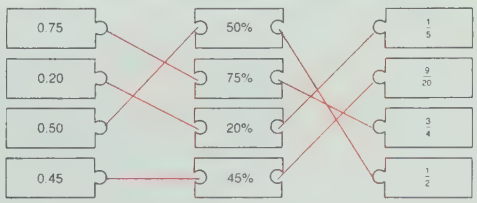
1. 17% — 0.17
2. 58% — 0.58
3. 40% — 0.40
4. 6% — 0.06
5. 20% — 0.20
6. 95% — 0.95

Write each percent as a fraction in lowest terms.

7. 32% — $\frac{8}{25}$
8. 60% — $\frac{3}{5}$
9. 10% — $\frac{1}{10}$
10. 5% — $\frac{1}{20}$
11. 47% — $\frac{47}{100}$
12. 20% — $\frac{1}{5}$
13. 100% — 1
14. 99% — $\frac{99}{100}$
15. 50% — $\frac{1}{2}$

Double Match

Match each percent to a decimal and to a fraction in lowest terms.



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Finding a Percent of a Number

A group of 200 people were asked to name their favorite color.
32% chose red. How many people chose red?

Find 32% of 200

or 0.32 of 200.

$$\begin{array}{r} 200 \\ \times\ 0.32 \\ \hline 400 \\ 600 \\ \hline 64.00 \end{array}$$

To find a percent of a number, change the number to a decimal and multiply.

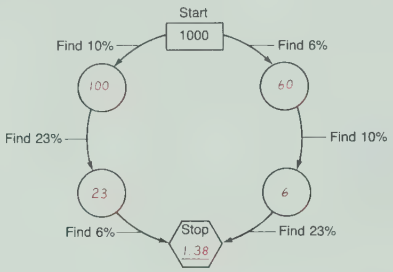
Remember to place the decimal correctly.

64 out of the 200 people chose red.

Find each of these.

1. 20% of 150 30
2. 35% of 300 105
3. 8% of 400 32
4. 8% of 40 3.2
5. 85% of 50 42.5
6. 13% of 1400 182

Start with 1000 and follow the paths in both directions.
The result in the stop sign will be the same.



3.2 30

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Changing Values in Ratios

Find the missing terms in these ratios.

$\frac{0.5}{0.8} = \frac{5}{\blacksquare}$

$0.5 \times 10 = 5$
$8 \times 10 = 8$

8 is the missing term.

$\frac{0.5}{0.8} = \frac{\blacksquare}{80}$

$0.8 \times 100 = 80$
$0.5 \times 100 = 50$

50 is the missing term.

Remember:
To multiply by
10—move the decimal 1 place to the right.
100—move the decimal 2 places to the right.
1000—move the decimal 3 places to the right.

Changing the place value in a ratio by multiplying both the numerator and denominator by 10, 100, or 1000 will result in an equivalent ratio.

Finding the missing term in each ratio.

1. $\frac{1.9}{2.4} = \frac{19}{24}$ (× 10 / × 10)
2. $\frac{0.36}{0.47} = \frac{36}{47}$ (× 100 / × 100)
3. $\frac{0.10}{0.53} = \frac{10}{53}$ (× 100 / × 100)
4. $\frac{7.5}{0.81} = \frac{75}{81}$
5. $\frac{7}{11} = \frac{70}{11}$
6. $\frac{0.85}{684} = \frac{8.5}{6840}$
7. $\frac{0.005}{0.373} = \frac{0.5}{37.3}$
8. $\frac{86}{113} = \frac{8600}{11300}$
9. $\frac{6.487}{107.8} = \frac{64.87}{1078}$

In each row there are 3 equivalent ratios. Circle the ratio that does not belong with the other 3.

10. $\frac{8.75}{10}$ $\frac{87.5}{100}$ (**$\frac{875}{100}$**) $\frac{875}{1000}$
11. $\frac{0.47}{6.4}$ $\frac{4.7}{64}$ $\frac{47}{640}$ (**$\frac{47}{64}$**)
12. (**$\frac{3}{0.75}$**) $\frac{3}{7.5}$ $\frac{30}{75}$ $\frac{300}{750}$
13. $\frac{0.008}{0.573}$ $\frac{0.08}{5.73}$ $\frac{0.8}{57.3}$ (**$\frac{0.8}{5.73}$**)
14. $\frac{5.752}{13.6}$ (**$\frac{57.52}{13.6}$**) $\frac{57.52}{136}$ $\frac{575.2}{1360}$

0.5 24 $\frac{875}{100}$ 8.1

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Dividing with Tenths

Divide 92.4 by 1.5.

$$\begin{array}{r} 61.6 \\ 15\overline{)924.0} \\ 90 \\ 24 \\ 15 \\ 90 \\ 90 \\ 0 \end{array}$$

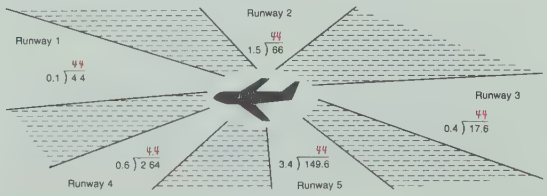
1.5)92.4 — Multiply 1.5 by 10 and 92.4 by 10 to make the divisor a whole number.

Add a 0 to get another place.

Divide. Then check by multiplying.

1. $0.4\overline{)1.84}$ → 46 → 160, 24, 24, 0 — check: 46 × 0.4 = 18.4
2. $0.9\overline{)4.14}$ → 4.6 → 360, 54, 54, 0 — check: 4.6 × 0.9 = 41.4
3. $0.5\overline{)32.5}$ → 65 → 300, 25, 25, 0 — check: 65 × 0.5 = 32.5
4. $0.1\overline{)4.970}$ → 49.7
5. $4.8\overline{)1200}$ → 25 → 96, 240, 240, 0 — check: 25 × 48 = 1200
6. $2.5\overline{)1.350}$ → 0.54 → 125, 100, 100, 0 — check: 0.54 × 2.5 = 13.50

Which runway should the plane land on?
Divide. Land the plane on the runway whose quotient is different from the others.



The plane should land on Runway 4.

4.97 4.6

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Rounding Quotients

Divide 7.341 by 0.4. Round the quotient to the nearest tenth, hundredth, and thousandth.

Nearest tenth:

$$\begin{array}{r} 18.35 \\ 0.4\overline{)7.341} \\ 4 \\ 33 \\ 32 \\ 14 \\ 12 \\ 21 \\ 20 \\ 1 \end{array} \quad \blacktriangleright 18.4$$

When rounding to the nearest tenth, divide to the hundredths.

Nearest hundredth:

$$\begin{array}{r} 18.352 \\ 0.4\overline{)7.3410} \\ 4 \\ 33 \\ 32 \\ 14 \\ 12 \\ 21 \\ 20 \\ 10 \\ 8 \\ 2 \end{array} \quad \blacktriangleright 18.35$$

When rounding to the nearest hundredth, divide to the thousandths.

Nearest thousandth:

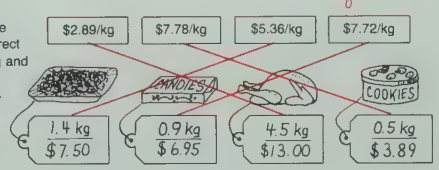
$$\begin{array}{r} 18.3525 \\ 0.4\overline{)7.34100} \\ 4 \\ 33 \\ 32 \\ 14 \\ 12 \\ 21 \\ 20 \\ 10 \\ 8 \\ 20 \\ 20 \\ 0 \end{array} \quad \blacktriangleright 18.353$$

When rounding to the nearest thousandth, divide to the ten thousandths.

Divide. Round each quotient to the nearest tenth.

1. $0.3\overline{)5.680}$ → 1893 → 18.9 (300, 268, 240, 28, 27, 10, 9, 1)
2. $0.5\overline{)2.460}$ → 492 → 4.9 (200, 46, 45, 10, 10, 0)
3. $0.4\overline{)21.5300}$ → 5385 → 53.9 (200, 15, 12, 33, 32, 10, 8, 20, 20, 0)

Match the unit price labels with the correct product by dividing and rounding to the nearest hundredth.



18.9

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Estimating and Testing

One way to solve a problem is to make an estimate of what you think the answer might be and then to test the estimate. If you were wrong the first time, you usually can tell whether your estimate was too large or too small. Then you can make a second, better estimate.

1. Bob and Alex were playing darts. They each threw 4 darts and scored 32 points each. None of Bob's darts landed in the same area as any of Alex's. Where might their darts have landed?

   four in area 8 for one boy; three in area 10

   and one in area 2 for other

Bob and Alex

2. The next time they played, they each scored 32 points again. This time one of Bob's darts landed in the same area as some (one or more) of Alex's. Where might their darts have landed this time?

   one in area 10, two in area 8, one in area 6

   for Bob; three in area 10, one in area 2 for

   Jim

3. Jenny and Amy both scored 28 points with 4 darts. None of Jenny's darts landed in the same area as any of Amy's. Where might their darts have landed?

   four in area 7 for one girl; three in area 9 and

   one in area 1 for other

Jenny and Amy

4. Marty scored 96 points with 4 darts. Where might they have landed?

   four in area 24 or two in area 15, one in

   area 27, one in area 39

Marty

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Too Much Information

In each problem underline the information needed and draw a line through the information not needed.

1. The Québec Coliseum can seat 10 484. ~~The Winnipeg Arena can seat 10 151~~ and the Montréal Forum 16 074. How many more people can the Forum seat than the Coliseum?

2. Florence has $39.73 in her savings account. ~~She received $15.00 for her birthday and earned $6.00 helping her neighbor plant shrubs~~. She deposited $9.50 in her account. How much money does she have in her savings now?

3. ~~Mrs. Chu drove 235 km last week~~. She bought 40 L of gas at $0.44/L and ~~gave the attendant $20~~. How much did the gasoline cost?

4. Mr. and Mrs. Freeman took their two children to the fair. Tickets cost $3.50 for an adult and $1.75 for a child. ~~At the fair they each had a hot dog and a soda. Hot dogs cost 95¢ each and sodas cost 65¢~~. How much were the tickets?

5. The Fix-It Plumbing Service charges $18.50 an hour for labor on weekdays and ~~$25.00 an hour on weekends and after 5:00 p.m.~~ The plumber arrived at the Stones' house on Friday morning at 10:00 a.m. He finished at 1:00 p.m. How much was the bill for labor?

6. Frank charges $1.75 an hour for baby-sitting. ~~He also mows lawns, rakes leaves, and so on. He charges $2.50 for those services~~. The other day he baby-sat for 6 h. How much did he earn baby-sitting?

7. ~~At the record store there are 4 different prices for records. The **A** records cost $3.98~~, the **B** records cost $4.50, the **C** cost $5.95, ~~and the **D** cost $7.00~~. Mark bought two **B** records and a **C** record. How much did he spend?

8. ~~Nancy wants to buy a new computer game. She cannot make up her mind whether to buy~~ *Alien* for $9.95 or *Hit It* for $12.25. ~~She has $15~~. How much more does *Hit It* cost than *Alien*?

9. On last week's spelling test, ~~Mal got 19 right out of a possible 20~~. Gert got 17 right. If each right answer is worth 5 points, what was Gert's score?

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Finding Information

Tell what you might do to find this information. *Answers will vary.*

1. the northernmost settlement in Canada

   use an atlas or an almanac

2. the city in the world with the greatest population

   use an almanac or an encyclopedia

3. the population of the city in the world with the greatest population

   use an almanac or an encyclopedia

4. the number of students in your school

   ask at the school office

5. the number of students in grades 1 to 7 in your town or city

   ask at the school board office

6. the average January temperature in your region

   call the weather bureau

7. the name of the person who was Prime Minister in 1955

   use an encyclopedia or an almanac

8. the shortest road distance between Ottawa and Toronto

   use a road map

9. the number of Representatives in the U.S. Congress

   use an encyclopedia

10. the average height of the students in your class

    measure and calculate

Find two items of information from those above. Report to your class.

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Skills Practice

These problems use skills that you have learned in previous grades, as well as ones that are new this year.

1. Joanne drove ■ km/h for ▲ h. How far did she go? Circle the operation you would use to solve this problem.

   \+ − ⊗ ÷

2. Dieter, Tim, and Ellen are going to share evenly a box of 26 old records they bought at a garage sale. How many records will each receive?

   8 (2 are left over)

3. After the movie Betsy and Margaret stopped to buy ice-cream cones. Cones are 85¢ for small, and $1.00 for large. How much did they spend?

   cannot answer

4. The sum of two numbers is 40. Their product is 396. What are the numbers?

   18, 22

5. You have four coins in your pocket—quarters, dimes, nickels, pennies. How much money do you have? Make a table.

25¢	10¢	5¢	1¢	Amount
1	1	1	1	46¢
1	1	2	0	45¢
1	2	1	0	50¢
1	0	1	2	32¢
1	3	0	0	55¢
1	0	3	0	40¢
1	0	0	3	28¢
0	1	1	2	17¢
0	1	2	1	21¢
0	2	1	1	26¢
0	3	1	0	35¢
0	3	0	1	31¢
0	1	0	3	13¢
1	1	3	0	25¢
0	0	1	3	8¢
2	1	1	0	65¢
2	1	0	1	61¢
2	0	1	1	56¢
2	2	0	0	70¢
2	0	2	0	60¢
2	0	0	2	52¢
3	0	0	1	76¢
3	0	1	0	80¢
3	1	0	0	85¢
4	0	0	0	$1.00
0	4	0	0	40¢
0	0	4	0	20¢
0	0	0	4	4¢

6. Agnes, Bob, and Carl are running for class office. There are three positions—president, secretary, and treasurer. How many ways could the three students win the three offices? Make a list.

   6

P	S	T
A	B	C
A	C	B
B	A	C
B	C	A
C	A	B
C	B	A

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Using Decimals

1. Joshua stopped at the produce counter. He bought 5 kg of potatoes, 0.6 kg of tomatoes, and 1.4 kg of apples. How many kilograms of fruit and vegetables did he buy?

7 kg

2. Helen's dog has three puppies. Their masses are 4.4 kg, 3.75 kg, and 4.16 kg. What is their total mass?

12.31 kg

3. Betty and her friends went on a four-day hike. They hiked 6.75 km the first day, and 9.25 km, 6.8 km, and 10.35 km on the next three days. How far did they hike in all?

33.15 km

4. One day the girls passed a sign that said "Altitude: 823.5 m." Further along the road was another sign that said "Altitude: 1033 m." How far up had they climbed between signs?

209.5 m

5. At the beginning of a trip, Mrs. Harrigan made a note of her odometer reading. It was 24 242.5. When she returned from the trip it was 26 333.2. How many kilometres did she drive on the trip?

2090.7 km

6. Mrs. Harrigan also kept a log of the gas she bought. She bought gas five times, in these amounts: 41.3 L, 35.9 L, 37.6 L, 43.8 L, and 49.9 L. How many litres did she buy in all?

208.5 L

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Finding the Number of Possibilities

Draw a tree diagram to show the different ways that each set of cards can be arranged in your hand. Then give the number of possible arrangements.

1. J♠ 2♦

1. First Second (2)
J — 2
2 — J

2. Q♣ 4♥ 8♦

2 First Second Third (6)
Q — 4 — 8
Q — 8 — 4
4 — Q — 8
4 — 8 — Q
8 — Q — 4
8 — 4 — Q

3. 2♠ A♦ J♥ 10♣

3 First Second Third Fourth (24)
A — J — 10
A — 10 — J
J — A — 10
J — 10 — A
10 — A — J
10 — J — A
2 — J — 10
2 — 10 — J
J — 2 — 10
J — 10 — 2
10 — 2 — J
10 — J — 2
2 — A — 10
2 — 10 — A
A — 2 — 10
A — 10 — 2
10 — 2 — A
10 — A — 2
2 — A — J
2 — J — A
A — 2 — J
A — J — 2
J — 2 — A
J — A — 2
10 — A — J
10 — J — A
2 — J — 10
2 — 10 — J
A — 2 — 10
A — 10 — 2
10 — 2 — A
10 — A — 2
2 — A — J
2 — J — A
A — 2 — J
A — J — 2
J — 2 — A
J — A — 2
2 — J — A
2 — A — J
A — 2 — J
A — J — 2
J — 2 — A
J — A — 2

Use exercises 1 to 3 to complete these statements.

4. Number of choices for first card × Number of choices for second card = Number of possible arrangements

2 × 1 = 2

5. Number of choices for first card × Number of choices for second card × Number of choices for third card = Number of possible arrangements

3 × 2 × 1 = 6

6. Number of choices for first card × Number of choices for second card × Number of choices for third card × Number of choices for fourth card = Number of possible arrangements

4 × 3 × 2 × 1 = 24

7. How many different ways can you arrange 5 cards in your hand?

120

8. How many different ways can you arrange 8 cards in your hand?

40 320

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Solving Problems in Two or More Steps

Solve each problem. Show your work.

1. At the gas station Curt bought 34 L of gas at $0.41/L and 1 L of oil for $1.98. How much did he spend?

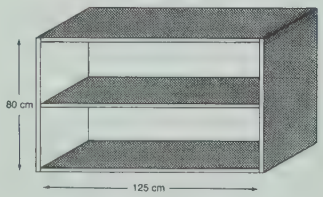
$15.92

2. Diane bought a record for $4.72 and a tape for $6.13. She gave the clerk $15.00. How much change did she receive?

$4.15

3. Zelda is building a bookcase like the one shown. The back is open. If boards are $3.20/m, how much will the lumber cost?

$17.12



4. Complete the cheque register. Hint: first subtract the amount of cheque number 23 from the balance.

Cheque number	Date	Transaction	Debit (−)	Credit (+)	Balance $423.00
23	84 07 05	Green's Grocer	27.35		396.45
24	84 07 13	Telephone	32.16		364.29
	84 07 15	Paycheque		214.92	579.21
25	84 07 15	Al's Hardware	12.90		566.31

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Reasonable Measurements

Circle the most reasonable measurement.

1. What is the mass of the puppy?

36 kg (3.6 kg) 0.36 kg

2. How far is it to the public library?

(8 km) 8 m 8 L

3. How much juice does the pitcher hold?

(1.3 L) 1.3 g 1.3 mL

4. What is the area of the rug?

15 cm² 150 m² (15 m²)

5. How long is the truck?

0.5 km 25 kg (15 m)

6. How long did it take Charles to walk to school?

25 s (25 min) 25 h

7. What is the volume of Pat's lunch box?

(7500 cm³) 7500 cm 7500 cm²

8. What is the perimeter of your math book?

93 cm² 93 mm (93 cm)

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Writing and Solving Equations

Solve each equation. Write a related equation if necessary.
Related equations may not be given.

1. $15 - n = 8$

   $15 - 8 = n$

   $7 = n$

2. $27 - 19 = n$

   $27 - 8 = n$

   $19 = n$

3. $4 \times n = 36$

   $n = 36 \div 4$

   $n = 9$

4. $n \times 11 = 99$

   $n = 99 \div 11$

   $n = 9$

5. $52 \div n = 4$

   $52 \div 4 = n$

   $13 = n$

6. $n \times 7 = 154$

   $n = 154 \div 7$

   $n = 22$

Write and solve an equation for each problem.

7. Mrs. Lamont bought 4 packages of hot dogs. She paid $5.00 for them. How much did each package cost?

   $\$5.00 \div 4 = n$

   $n = \$1.25$

8. She also bought a jar of mustard for 69¢ and a jar of relish for 89¢. How much did the mustard and relish cost together?

   $69¢ + 89¢ = n$

   $n = 158¢, \$1.58$

9. There will be 23 people at the cook-out. Assume that each will drink 0.5 L of lemonade. How much lemonade should be made?

   $23 \times 0.5 = n$

   $n = 11.5;\ 11.5\ L$

10. Of the 23 guests, there will be 14 adults. How many children will be there?

    $23 - 14 = n$

    $n = 9$

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Logical Thinking

This map of Canada has 11 cities marked with dots. An airline has routes connecting some of the cities as shown.

An airline has an agent in each of the 11 cities. We will call them Anna, Burt, Carl, Donna, Elaine, Fred, Gil, Harriet, Ian, Jane, and Ken. Since the agents in cities with connecting flights need to talk to each other now and then, it is a good idea for them to be friends. It was learned that the following pairs are friends.

Anna–Burt	Harriet–Fred	Ian–Ken	Jane–Ian
Gil–Jane	Gil–Ian	Donna–Elaine	Anna–Gil
Ken–Elaine	Donna–Ken	Donna–Ian	Jane–Carl
Carl–Harriet	Gil–Ken		

Can you place the 11 people in the 11 cities so that the cities with connecting flights are staffed by people who are friends?

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Using Fractions

The type in newspapers and books generally has proportional spacing. That means that different letters take up different amounts of horizontal space. At one newspaper these are the counts for headlines.

Horizontal Space Count

Symbol	Count	Symbol	Count	Symbol	Count
A	2	a	1	0	1
B	2	b	1	1	1
C	2	c	1	2	1
D	2	d	1	3	1
E	2	e	1	4	1
F	2	f	1	5	1
G	2	g	1	6	1
H	2	h	1	7	1
I	1	i	½	8	1
J	2	j	1	9	1
K	2	k	1	Punctuation	½
L	2	l	½	spaces	2
M	2½	m	1½		
N	2	n	1		
O	2	o	1		
P	2	p	1		
Q	2	q	1		
R	2	r	1		
S	2	s	1		
T	2	t	1		
U	2	u	1		
V	2	v	1		
W	2½	w	1½		
X	2	x	1		
Y	2	y	1		
Z	2	z	1		

Find the horizontal count for each headline.

1. MATHEMATICS IS FUN 34
2. Mathematics Is Important 27
3. Premier Visits New School 31
4. 31 People Injured $18\frac{1}{2}$
5. Temperature Climbs to Over 35 37
6. your name in capital letters

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Considering the Chances

The chance, or probability, of an event happening is a ratio:

$$\frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

For example, the probability of spinning a 1 on this spinner is $\frac{1}{3}$.

The probability of spinning a 1 on this spinner is $\frac{1}{2}$.

$\frac{2}{4} = \frac{1}{2}$

Think about spinning a 1. Answer the questions.

1.

How many favorable outcomes? 1

How many possible outcomes? 4

What is the probability of spinning a 1? $\frac{1}{4}$

2.

How many favorable outcomes? 1

How many possible outcomes? 8

What is the probability of spinning a 1? $\frac{1}{8}$

For each spinner, give the probability.

3. spinning a 1.

$\frac{1}{6}$

4. spinning a 3.

$\frac{1}{2}$

5. spinning a 1, 2, 3, or 4.

1

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Solving Problems in More Than One Step

The Record Shack is having a sale. If you buy $10.00 worth of records, but less than $20.00, you receive a 10% discount. From $20.00 to $29.99 worth, you receive 15% off. If your purchase is worth $30.00 or more, you receive 20% off. Find the total amount of each purchase. There is a sales tax of 5%.

1. 1 record for $6.89; 3 tapes at $5.75 each.

   $21.55

2. 1 tape for $5.75; 3 records at $4.59 each; 2 records at $6.89 each.

   $27.97

3. 2 records at $4.59 each; 1 tape for $8.90; 3 records at $7.96 each.

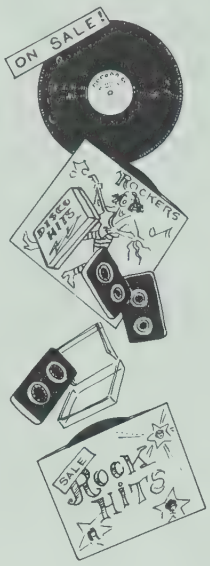
   $35.25

4. 3 tapes at $8.90 each; 3 records at $6.89 each; 2 records at $4.59 each.

   $47.50

5. 1 tape for $5.75; 5 records at $4.59 each; 1 record for $7.96.

   $30.80



NAME

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Work With Models

Cut a strip of paper about 40 cm long.

Make a half twist in it and tape or glue the ends together.
You now have a Moebius strip.

With a pencil, draw a line along the strip.
Continue until you return to the place you started.
What happened?

The line is on both sides.

Cut around the strip at the middle.
What happened?

The strip is now twice as long with two full twists.

What do you think will happen if you make another strip and cut around it, staying near one edge?

Answers will vary.

Try it. What happened?

You get a Moebius strip the same length as the original interlocked with a strip twice as long with $1\frac{1}{2}$ twists.

Find some information about the person for whom the strip is named.

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Solving Problems Without Pencil and Paper

Here are some ways to calculate in your head.

To subtract 19, subtract 20 and add 1.

$$\begin{aligned} 93 - 19 &= (93 - 20) + 1 \\ &= 73 + 1 \\ &= 74 \end{aligned}$$

Try to do each of these in your head.

1.	2.	3.	4.	5.
76 − 19 = 57	85 − 19 = 66	37 − 19 = 18	26 − 19 = 7	103 − 19 = 84

You can use a similar short cut to add 19.

$$\begin{aligned} 35 + 19 &= (35 + 20) - 1 \\ &= 55 - 1 \\ &= 54 \end{aligned}$$

6.	7.	8.	9.	10.
17 + 19 = 36	43 + 19 = 62	65 + 19 = 84	91 + 19 = 110	132 + 19 = 151

Find a short cut for each. Explain what you did.

11.	12.	13.	14.
14 + 39 = 53	75 − 29 = 46	62 + 29 = 91	103 + 49 = 152
add 40 subtract 1	subtract 30 add 1	add 30 subtract 1	add 50 subtract 1

Here is a way to do some subtractions without regrouping.

$$\begin{aligned} 200 - 89 &= (200 - 1) - (89 - 1) \\ &= 199 - 88 \\ &= 111 \end{aligned}$$

Change each subtraction so that you can complete it without grouping.

499 + 2

15.	16.	17.
400 − 178 = 222 (399 − 177)	3000 − 957 = 2043 (2999 − 956)	501 − 258 = 243 (499 − 256)

NAME

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Skills Review

1. Take a survey in your class. Find out the favorite food, record, rock group, or sport, and make a bar graph.

   Answers will vary

2. Make a list of at least five things that would affect your choice of what kind of drinks to offer in the school cafeteria.

   Answers will vary

3. Robert took the bus to visit his cousin. The bus made 6 stops before Robert got off. It left at 9:08 and made the first stop at 10:05. How long did the whole trip take?

   cannot answer; need time of arrival.

4. Katrina bought 2 records for $3.97 each, 1 record for $6.88, and a tape for $5.75. There is an 8% sales tax. How much change should Katrina get from $20.00?

   $20.00 is not enough.

5. At the fruit stand Mr. Cross bought 3 kg of apples for $2.25/kg, 500 g of grapes for $3.15/kg, and 2.5 kg of peaches at $2.85/kg. How much was his total bill?

   $15.46

6. The Pizza Palace offers 3 sizes of pizza and 4 different toppings. You can order any one topping or any combination of toppings. How many different pizzas can be ordered?

   45

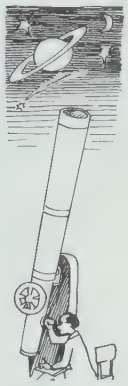
7. How many ways can you make change for a dollar with no pennies?

   40

NAME

SPM 6 Masters With Unit 1 — 81

Scientific Notation



Scientific notation is a short way to write very large numbers.

An astronomer needs a short way to write that the distance from the earth to the sun is 150 000 000 km. He shortens the number this way.

150 000 000 = 15 × 10 000 000
or 1.5 × 100 000 000
or 1.5 × 10^8

In scientific notation, one number must be less than 10 (1.5), and the other number must be a power of 10 (10^8).

Written in scientific notation, the distance from the earth to the sun is 1.5 × 10^8 km.

Here are some other examples.

3 200 = 3.2 × 1000 = 3.2 × 10^3
480 000 = 4.8 × 100 000 = 4.8 × 10^5
1000 = 1 × 1000 = 1 × 10^3 = 10^3

Write each number in scientific notation.

1. 1 000 000 $1 \times 10^6 = 10^6$
2. 20 000 2×10^4
3. 86 000 8.6×10^4
4. 570 000 5.7×10^5
5. 45 000 000 4.5×10^7
6. 320 000 000 3.2×10^8
7. 70 000 000 000 7×10^{10}
8. 240 000 000 000 2.4×10^{11}

Write the standard number for each.

9. The earth has existed for 3.3 × 10^9 a (years). 3 300 000 000
10. Light travels at 3 × 10^{10} cm/s (centimetres per second). 30 000 000 000
11. The nearest star to earth besides the sun is 4 × 10^{13} km away. 40 000 000 000 000
12. Dinosaurs roamed the earth more than 10^8 a ago. 100 000 000

They disappeared about 7 × 10^7 a ago. 70 000 000

NAME

SPM 6 Masters With Unit 2 — 82

Addition Puzzle

Write the correct digit in each shape to complete the addition problems.

1. 2 7 2 + 4 9 5 = 7 6 8
2. 4 6 3 + 3 6 3 = 8 2 6
3. 2 1 4 + 1 3 2 = 3 4 6
4. 1 5 2 + 4 7 2 = 6 2 4
5. 6 3 8 + 3 4 5 = 9 8 3
6. 1 5 2 + 1 6 3 = 3 1 5
7. 1 6 3 + 1 6 3 = 3 2 6
8. 4 1 5 + 1 9 6 = 6 1 1
9. 7 2 3 + 2 5 2 = 9 7 5
10. 3 8 9 + 1 1 1 = 5 0 0

NAME

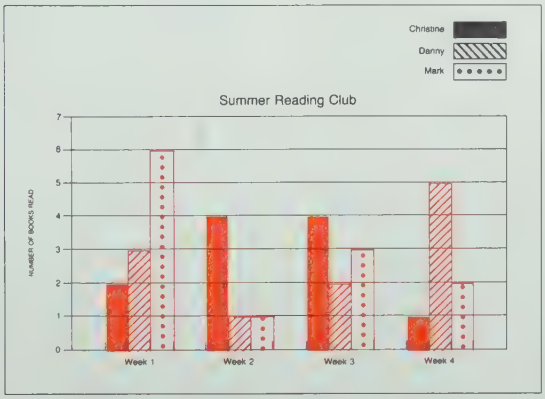
SPM 6 Masters With Unit 3 — 83

Multiple Bar Graphs

Christine, Danny, and Mark were members of the summer reading club at their library. The chart shows the number of books that each of them read during the first four weeks of summer.

Construct a triple bar graph below to record the information.

	Number of Books Read			
	Week 1	Week 2	Week 3	Week 4
Christine	2	4	4	1
Danny	3	1	2	5
Mark	6	1	3	2



NAME

SPM 6 Masters With Unit 4 — 84

Number Games

Arrange the given digits to give the greatest possible product or quotient.

1. 5, 6, 7, 8: 85 × 76
2. 0, 2, 3, 4: 320 × 4
3. 1, 2, 8, 9: 1) 9 8 2
4. 4, 6, 9: 4) 9 6

Arrange the given digits to give the smallest possible product or quotient.

5. 1, 2, 3, 4: 13 × 24
6. 1, 7, 9, 2: 279 × 1
7. 1, 2, 6: 6) 1 2
8. 4, 6, 9, 8: 9) 4 6 8

NAME

SPM 6 Masters With Unit 5

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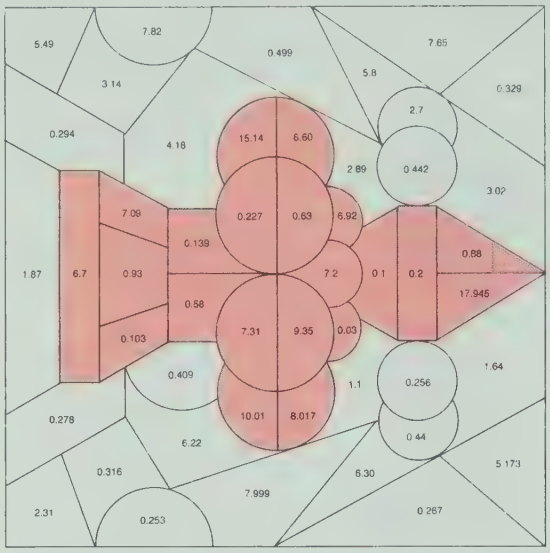
Lost in Space



1. Shade all the decimals between 6.49 and 7.5.
2. Shade all the decimals less than 0.25.
3. Shade all the decimals between 0.5 and 1.
4. Shade all the decimals greater than 8.

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SPM 6 Masters With Unit 6

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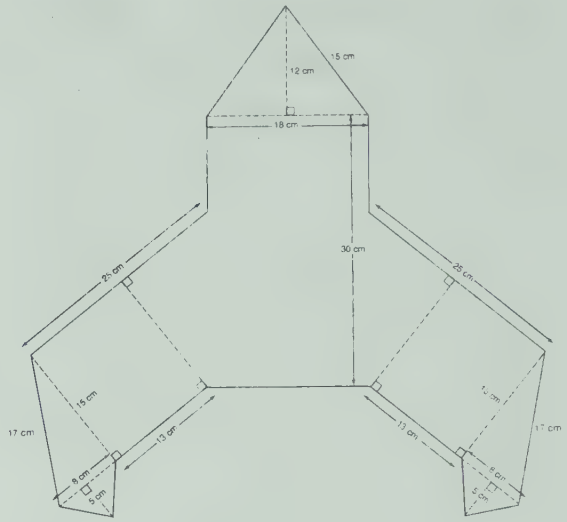
Kite Area

David drew this pattern for a kite he plans to make.



Compute the total area of the kite. 1378 cm^2

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SPM 6 Masters With Unit 7

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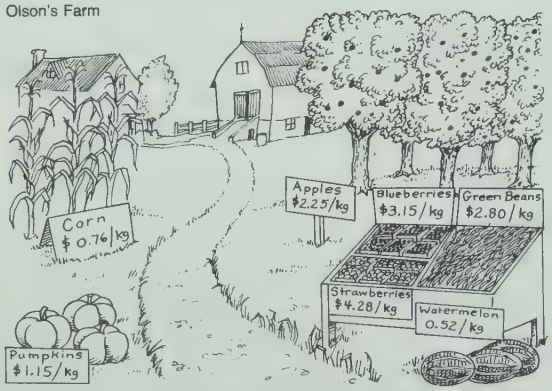
Olson's Farm



The price and the weight of each basket are given.
What is inside each basket?

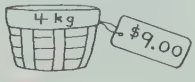
1. Strawberries

2. Blueberries

3. Green Beans

4. Corn

5. Pumpkins



6. Apples

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SPM 6 Masters With Unit 8

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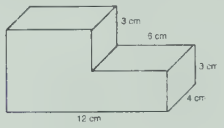
Volume Ticklers

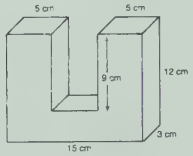
Compute the volume of each figure.

1.



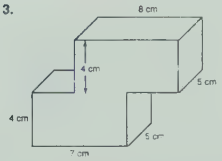
216 cm^3

2.



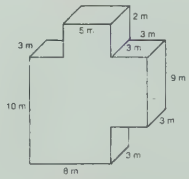
405 cm^3

3.



300 cm^3

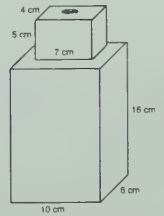
4.



351 m^3

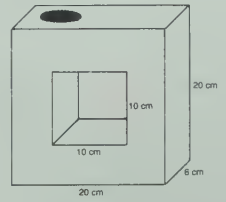
Give the mass of water each container can hold in grams and kilograms.

5.



1100 g = 1.1 kg

6.



1800 g = 1.8 kg

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With Unit 9

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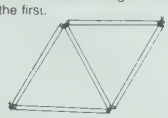
Octahedron Project

Polyhedra are solids each of whose faces is a polygon. In nature, rock crystals, bees' honeycombs, and wasps' nests are examples of polyhedra.

Follow the directions to make an octahedron. You will need string and 6 straws. Cut each straw in half. All 12 pieces must be the same size.

1. Thread 3 of the straws together to make a triangle.

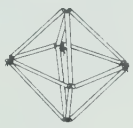
2. Thread another piece of string through one side of the triangle you just made. Now use 2 more straws to form a second triangle connected to the first.



3. Connect a third triangle in this way by attaching 2 more straws to the second triangle.

4. Thread the string through one side of the first triangle and one side of the third triangle. Connect one more straw. You will now have the top section of an octahedron.

5. Complete the bottom half of the octahedron by threading straws to form 4 more triangles. Each of the 4 straws at the bottom of the top half will be a side of the new triangle.



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SPM 6 Masters
With Unit 10

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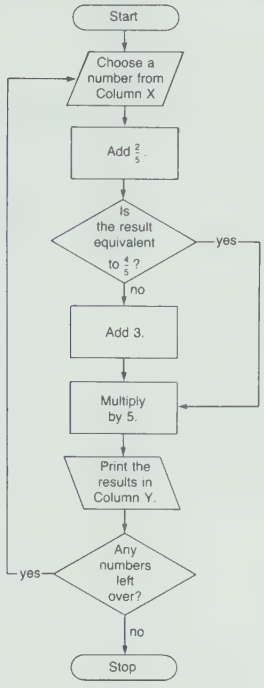
Fraction Flow Chart

Write the correct number in Column Y by following the steps in the flow chart



X	Y
$\frac{4}{10}$	4
$\frac{9}{15}$	20
$\frac{8}{20}$	4
$\frac{15}{25}$	20
$\frac{12}{30}$	$\frac{4}{5}$
$\frac{21}{35}$	20
$\frac{16}{40}$	4

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With Unit 11

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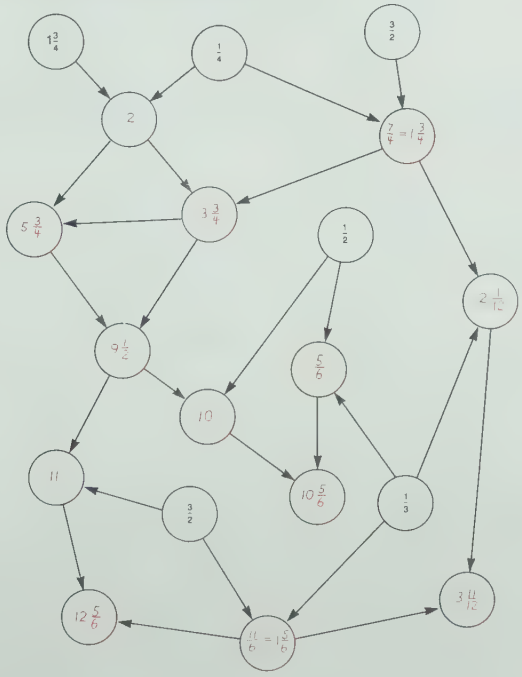
Fraction Puzzle

Complete the puzzle. Add the two numbers in the circles whose arrows point to the same empty circle.



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SPM 6 Masters
With Unit 12

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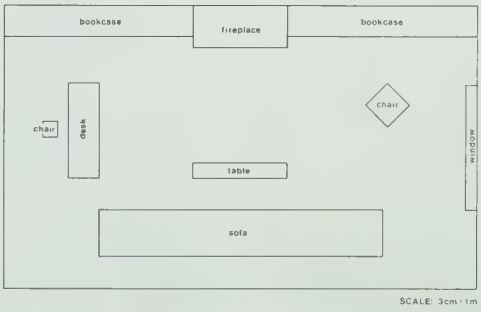
Scale Drawing

Here is a floor plan of the Wilsons' living room.



SCALE: 3cm : 1m

Use a ruler and the scale to answer the questions.

1. What is the actual perimeter of the room?

   16 m

2. Mrs. Wilson wants to purchase wall-to-wall carpeting. How much carpet is needed?

   15 m^2

3. Could an ink blotter measuring 0.5 m by 1 m fit on top of the desk?

   no

4. What is the actual area of the top of the desk?

   0.33 m^2

5. Mrs. Wilson is buying a window shade. How wide should the shade be to cover the window?

   1.33 m

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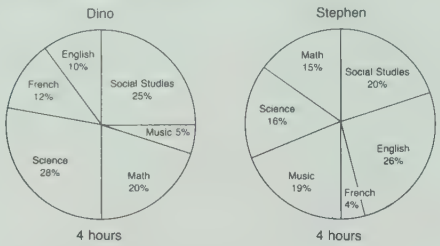
SPM 6 Masters With Unit 13 93

Circle Graphs

The two circle graphs show the percent of time Dino and Stephen spent on their studies during one week.



1. What is the sum of the percents on each graph?

   100 % 100 %

2. On which subject did Stephen spend the most time? English

3. How many minutes did Dino spend during the week studying music? 12 min

4. How many minutes altogether did Stephen and Dino spend studying math?

   84 min

5. How many minutes during the week did Dino spend studying math and social studies?

   108 min

6. Dino studied one subject for 24 min during the week. What subject was it?

   English

7. How many fewer minutes during the week did Stephen spend studying social studies than Dino?

   12 min

8. Stephen studied one subject for 36 min during the week. What subject was it?

   Math

NAME

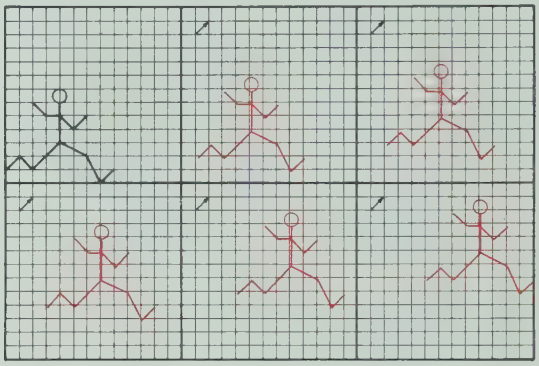
SPM 6 Masters With Unit 14 94

Create a Movie

The simplest motion picture is a series of pages that flip quickly through your fingers. Objects appear to be moving because each page places the objects further along a slide or turn.

Create your own motion picture by following these directions.

1. In each box, draw the slide image of the shape in the previous box for the slide arrow shown.
2. Cut out the boxes. Place them in a pile in reverse order. The first picture should be at the bottom of the pile.
3. Holding the top of the pile firmly in place, flip the pages through your fingers.



NAME

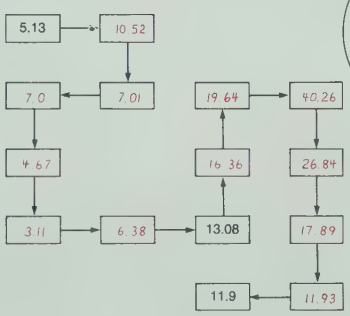
SPM 6 Masters With Unit 15 95

Decimal Paths

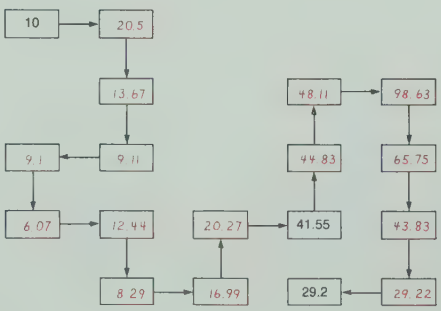
Use the clues to help you follow the path. When necessary, round your answer to the nearest hundredth.

Clues
- → multiply by 2.05
- ↓ divide by 1.5
- ← round to the nearest tenth
- ↑ add 3.28

1.



2.



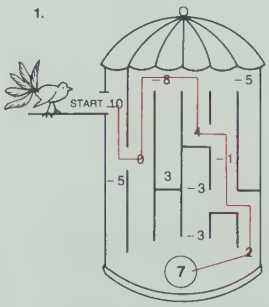
NAME

SPM 6 Masters With Unit 16 96

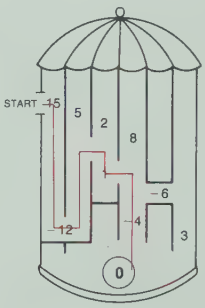
Integer Maze

Work your way through each maze by adding the integers.
The sum of the integers along the correct path is equal to the number at the bottom of each maze.

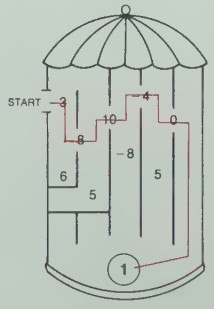
1.



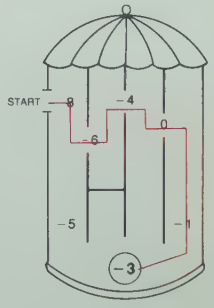
2.



3.



4.



Comparing and Ordering Numbers

Which is greater, 218 324 or 218 295?

Compare each digit.

hundred thousands	ten thousands	thousands	hundreds	tens	ones
2	1	8	3	2	4
2	1	8	2	9	5
same	same	same	3 hundreds > 2 hundreds so, 218 324 > 218 295		

Write >, <, or = to make true statements.

1. 51 248 _____ 51 268

2. 81 020 _____ 81 200

3. 998 765 _____ 998 765

4. 400 102 _____ 400 010

5. 453 986 _____ 453 968

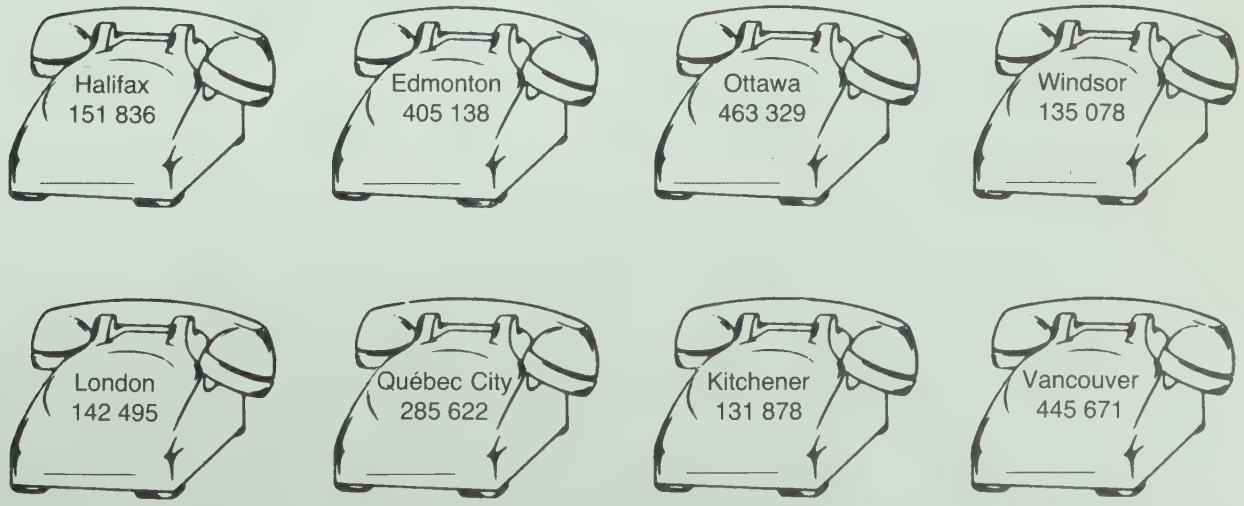
6. 312 406 _____ 321 406

7. 719 057 _____ 719 056

8. 460 001 _____ 460 011

Calling All Mathematicians

Using the numbers 1 to 8, rank the cities in order from greatest to least, according to the number of telephones in each.



= ⚅ < ⚄ < ⚃ > ⚀

Rounding

Round 475 283 to the nearest thousand, ten thousand, and hundred thousand.

Round to the nearest	What is the digit to the right of the rounding place?	Is the digit 5 or greater?	Round
thousand	2	no	down to 475 000
ten thousand	5	yes	up to 480 000
hundred thousand	7	yes	up to 500 000

Complete the chart. Round to the nearest thousand, ten thousand, and hundred thousand.

		thousand	ten thousand	hundred thousand
1.	123 467			
2.	565 070			
3.	194 513			
4.	608 924			
5.	889 756			

Find the Hidden Number.

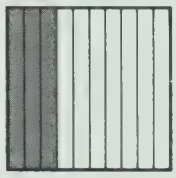
Round each number written in hundreds to the nearest hundred.
Round each number written in thousands to the nearest thousand.
Shade all squares whose numbers round to 700.
Shade all squares whose numbers round to 4000.

701	403	716	3800	3975	4516	4416
4200	821	689	822	702	804	4316
699	758	3986	651	650	1921	651

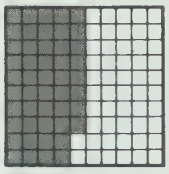
The hidden number is _____ .

Decimals

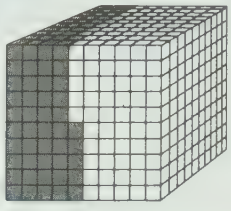
Study the charts.



This shows 3 tenths.
We can write 0.3.



This shows 48 hundredths.
We can write 0.48.



This shows 325 thousandths.
We can write 0.325.

Write the decimals.

1. 9 tenths _____

2. one and twenty-four thousandths _____

3. 13 hundredths _____

4. fifteen and two-hundredths _____

5. thirty-six thousandths _____

6. thirty and six-thousandths _____

What does each two mean?

7. 1.020 _____

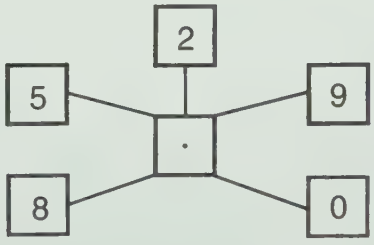
8. 1.200 _____

9. 2.100 _____

10. 11.002 _____

Creating Decimals

Using 4 of the given digits and the decimal point, follow the directions below to create a number. Do not repeat a digit in any one answer.



Create a number with

11. 2 in the hundredths place. _____

12. 9 in the tenths place. _____

13. 8 in the ones place and 5 in the tenths place. _____

14. 0 in the hundredths place and 5 in the ones place. _____

15. 5 in the tenths place and 8 in the thousandths place. _____

2 hundredths

0.9

Adding Two Numbers

Add 136 and 275.

Add the ones.

$$\begin{array}{r} {\scriptstyle 1} \\ 136 \\ +\,275 \\ \hline 1 \end{array}$$

Regroup 11 ones as 1 ten 1 one.

Add the tens.

$$\begin{array}{r} {\scriptstyle 11} \\ 136 \\ +\,275 \\ \hline 11 \end{array}$$

Regroup 11 tens as 1 hundred 1 ten.

Add the hundreds.

$$\begin{array}{r} {\scriptstyle 11} \\ 136 \\ +\,275 \\ \hline 411 \end{array}$$

The sum of 136 and 275 is 411.

Round to the nearest ten and add to estimate each sum.

1. $\begin{array}{r} 26 \\ +\,58 \\ \hline \end{array}$ **2.** $\begin{array}{r} 18 \\ +\,47 \\ \hline \end{array}$ **3.** $\begin{array}{r} 133 \\ +\,96 \\ \hline \end{array}$

Add.

4. $\begin{array}{r} 63 \\ +\,34 \\ \hline \end{array}$ **5.** $\begin{array}{r} 25 \\ +\,56 \\ \hline \end{array}$ **6.** $\begin{array}{r} 205 \\ +\,82 \\ \hline \end{array}$ **7.** $\begin{array}{r} 119 \\ +\,63 \\ \hline \end{array}$

8. $\begin{array}{r} 2.46 \\ +\,3.58 \\ \hline \end{array}$ **9.** $\begin{array}{r} 4.07 \\ +\,5.93 \\ \hline \end{array}$ **10.** $\begin{array}{r} 749 \\ +\,242 \\ \hline \end{array}$ **11.** $\begin{array}{r} 529 \\ +\,199 \\ \hline \end{array}$

Here is a code.

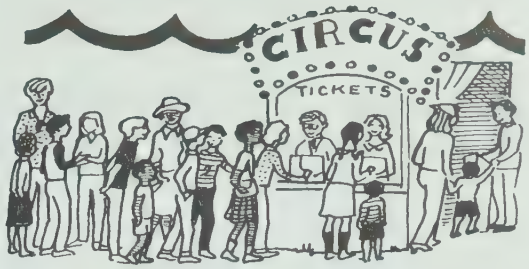
703	87	201	610	100	382
S	A	E	R	H	O

Who always sleeps with his shoes on? Add to answer the riddle.

$\begin{array}{r} 63 \\ +\,24 \\ \hline \end{array}$	$\begin{array}{r} 21 \\ +\,79 \\ \hline \end{array}$	$\begin{array}{r} 124 \\ +\,258 \\ \hline \end{array}$	$\begin{array}{r} 103 \\ +\,507 \\ \hline \end{array}$	$\begin{array}{r} 412 \\ +\,291 \\ \hline \end{array}$	$\begin{array}{r} 136 \\ +\,65 \\ \hline \end{array}$

97 6.04 30 + 60 = 90

Adding More Than Two Numbers



A circus sold 529 tickets on Friday, 361 tickets on Saturday, and 478 tickets on Sunday. How many tickets were sold altogether?

Place the numbers in vertical form and add.

Add the ones.

$$\begin{array}{r} {\scriptstyle 1} \\ 529 \\ 361 \\ +\,478 \\ \hline 8 \end{array}$$

Regroup 18 ones as 1 ten 8 ones.

Add the tens.

$$\begin{array}{r} {\scriptstyle 11} \\ 529 \\ 361 \\ +\,478 \\ \hline 68 \end{array}$$

Regroup 16 tens as 1 hundred 6 tens.

Add the hundreds.

$$\begin{array}{r} {\scriptstyle 11} \\ 529 \\ 361 \\ +\,478 \\ \hline 1368 \end{array}$$

Regroup 13 hundreds as 1 thousand 3 hundreds.

There were 1368 tickets sold altogether.

Add.

1. $\begin{array}{r} 27 \\ 14 \\ +\,38 \end{array}$

2. $\begin{array}{r} 125 \\ 36 \\ +\,197 \end{array}$

3. $\begin{array}{r} 66 \\ 109 \\ +\,85 \end{array}$

4. $\begin{array}{r} 196 \\ 234 \\ +\,421 \end{array}$

5. $\begin{array}{r} 324 \\ 467 \\ +\,103 \end{array}$

6. $\begin{array}{r} 1046 \\ 323 \\ 3158 \\ +\,4962 \end{array}$

7. \$10.63 + \$124.32 + \$4.93 = _____

Special Sums

Add each row vertically and horizontally. What do you notice about the sums?

_____

125	247	163	
94	103	338	
316	185	34	

Subtraction with No Regrouping

Lou is reading a book that has 289 pages. He has already read 137 pages. How many pages does he have left to read?

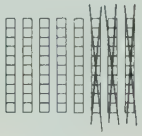
Subtract 137 from 289.

Subtract the ones.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 2 \end{array}$$

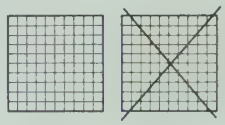
Subtract the tens.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 52 \end{array}$$



Subtract the hundreds.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 152 \end{array}$$



Check the answer by adding.

$$\begin{array}{r} 289 \\ -\,137 \\ \hline 152 \end{array} \quad \text{add} \quad \begin{array}{r} 137 \\ +\,152 \\ \hline 289 \end{array}$$

Lou has 152 pages left to read.

Subtract. Add to check.

1. $\begin{array}{r} 39 \\ -\,22 \end{array}$

2. $\begin{array}{r} 74 \\ -\,43 \end{array}$

3. $\begin{array}{r} 180 \\ -\,140 \end{array}$

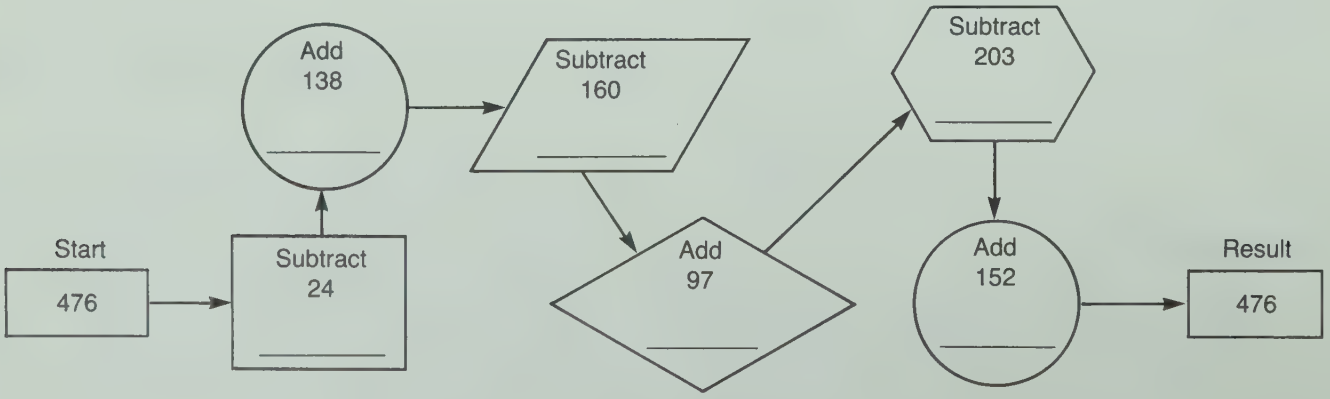
4. $\begin{array}{r} 6897 \\ -\,2747 \end{array}$

5. $\begin{array}{r} 82758 \\ -\,60437 \end{array}$

6. $\begin{array}{r} \$79.48 \\ -\,59.36 \end{array}$

Mystery Machine

Start with the number 476. Follow the directions. If you add and subtract carefully, you will end with the number 476.



$$\begin{array}{r} 39 \\ +\,17 \\ \hline \end{array}$$

17, 22

$$\begin{array}{r} 6897 \\ +\,4150 \\ \hline \end{array}$$

4150, 2747

Subtraction with Regrouping

Subtract 147 from 334.

Regroup 3 tens 4 ones as 2 tens 14 ones.

Subtract the ones.

$$\begin{array}{r} {\scriptstyle 2\ 1} \\ 3\not{3}\not{4} \\ -\ 1\ 4\ 7 \\ \hline 7 \end{array}$$

Regroup 3 hundreds 2 tens as 2 hundreds 12 tens.

Subtract the tens.

$$\begin{array}{r} {\scriptstyle 12} \\ 2\not{3}1 \\ \not{3}\not{3}\not{4} \\ -\ 1\ 4\ 7 \\ \hline 8\ 7 \end{array}$$

Subtract the hundreds.

$$\begin{array}{r} {\scriptstyle 12} \\ 2\not{3}1 \\ \not{3}\not{3}\not{4} \\ -\ 1\ 4\ 7 \\ \hline 1\ 8\ 7 \end{array}$$

Check by adding.

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 1\ 8\ 7 \\ +\ 1\ 4\ 7 \\ \hline 3\ 3\ 4 \end{array}$$

The difference is 187.

Subtract.

1. $\begin{array}{r} 76 \\ -\ 29 \\ \hline \end{array}$

2. $\begin{array}{r} 85 \\ -\ 37 \\ \hline \end{array}$

3. $\begin{array}{r} 28 \\ -\ 19 \\ \hline \end{array}$

4. $\begin{array}{r} 174 \\ -\ 28 \\ \hline \end{array}$

5. $\begin{array}{r} 421 \\ -\ 213 \\ \hline \end{array}$

6. $\begin{array}{r} 4986 \\ -\ 2897 \\ \hline \end{array}$

7. $\begin{array}{r} 7229 \\ -\ 5249 \\ \hline \end{array}$

8. $\begin{array}{r} \$34.21 \\ -\ 16.45 \\ \hline \end{array}$

Number Search

Subtract. Each answer can be found horizontally, vertically, or diagonally. The first one is done for you.

9. $\begin{array}{r} 294 \\ -\ 169 \\ \hline 125 \end{array}$

10. $\begin{array}{r} 392 \\ -\ 98 \\ \hline \end{array}$

1	3	7	6
0	2	9	4
6	8	5	2
7	1	0	4

11. $\begin{array}{r} 812 \\ -\ 185 \\ \hline \end{array}$

12. $\begin{array}{r} 7213 \\ -\ 789 \\ \hline \end{array}$

13. 2111 − 1957 = _____

14. Subtract 275 from 381.

Subtraction, Regrouping with Zeros

Subtract 785 from 2000.

Regroup 200 tens 0 ones as 199 tens 10 ones.

$$\begin{array}{r} {\scriptstyle 19\ 9\ 10} \\ \not{2}\not{0}\not{0}\not{0} \\ -\ 785 \\ \hline 5 \end{array}$$

Subtract.

$$\begin{array}{r} {\scriptstyle 19\ 9\ 10} \\ \not{2}\not{0}\not{0}\not{0} \\ -\ 785 \\ \hline 1215 \end{array}$$

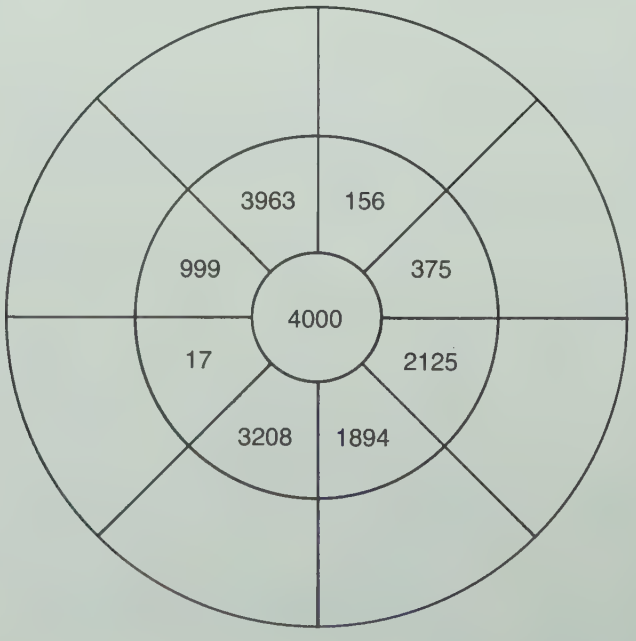
The difference is 1215.

Subtract.

1. $\begin{array}{r} 60 \\ -\ 24 \\ \hline \end{array}$ **2.** $\begin{array}{r} 400 \\ -\ 286 \\ \hline \end{array}$ **3.** $\begin{array}{r} 308 \\ -\ 89 \\ \hline \end{array}$ **4.** $\begin{array}{r} 5040 \\ -\ 2995 \\ \hline \end{array}$

5. $\begin{array}{r} 10\,000 \\ -\ 4723 \\ \hline \end{array}$ **6.** $\begin{array}{r} 23\,070 \\ -\ 16\,382 \\ \hline \end{array}$ **7.** $\begin{array}{r} \$20.00 \\ -\ 10.79 \\ \hline \end{array}$ **8.** $\begin{array}{r} \$107.04 \\ -\ 88.15 \\ \hline \end{array}$

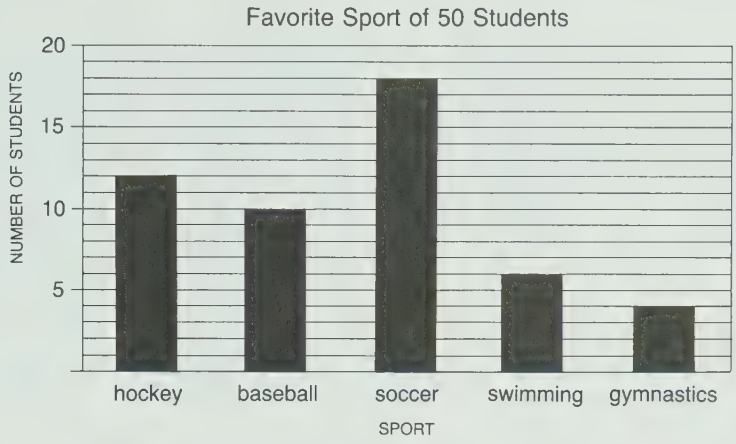
Complete the subtraction wheel. Subtract each number from the number in the middle of the wheel.



Bar Graphs

A bar graph organizes information in picture form. This graph shows the results when 50 students were asked to name their favorite sport.

The graph shows that 12 students named hockey as their favorite sport.



Use the bar graph above to answer the questions.

1. How many students named each sport?

baseball _____ soccer _____ swimming _____ gymnastics _____

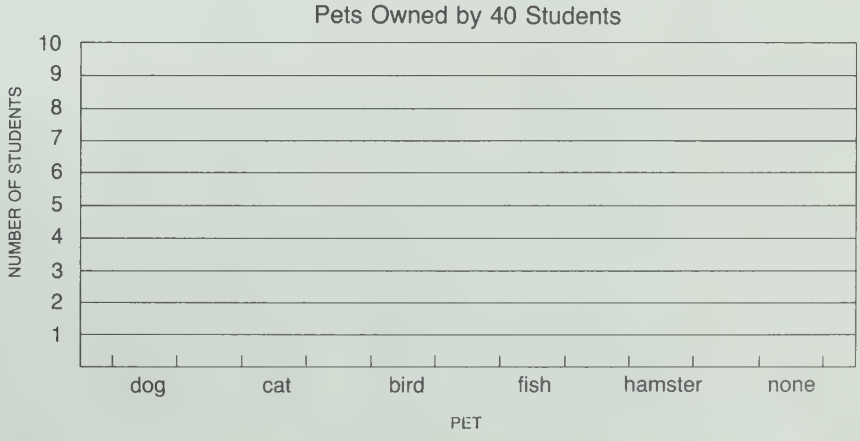
2. Which sport was named by the greatest number of students? _____

3. How many students in all named hockey, soccer, or baseball as their favorite sport? _____

4. How many more students preferred soccer to swimming? _____

The chart shows the results when 40 sixth grade students were asked to name the pet they owned. Complete the bar graph to show this information.

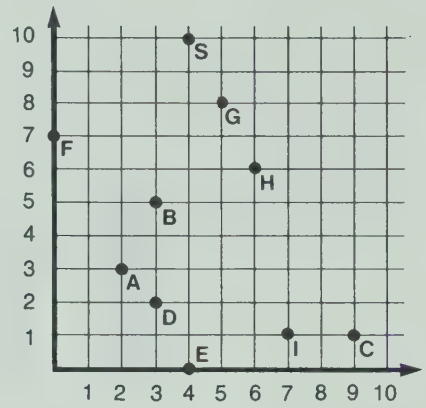
Pet	Number of Students
dog	10
cat	8
bird	2
fish	8
hamster	5
none	7



Ordered Pairs of Numbers and Points on a Grid

Every point on a grid can be represented by an ordered pair of numbers. The first number tells how many units to move over on the horizontal number line and the second number tells how many units to move up on the vertical number line.

Point **A** is found by moving over 2, then up 3. Point **A** can be matched with the ordered pair (2,3).



Write the ordered pair that matches each point.

1. Point B _____ **2.** Point C _____ **3.** Point D _____

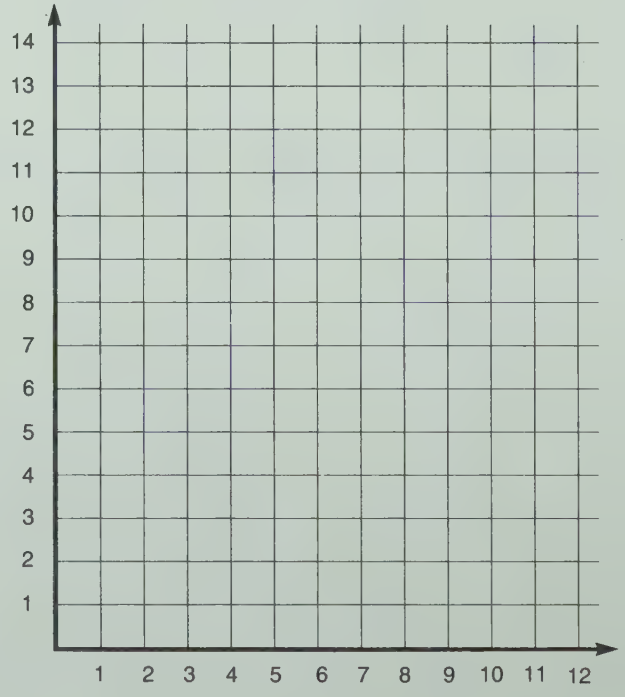
4. Point E _____ **5.** Point F _____ **6.** Point G _____

7. Point H _____ **8.** Point S _____ **9.** Point T _____

Dot-to-Dot

Plot each ordered pair. Connect the points in order as you plot them.

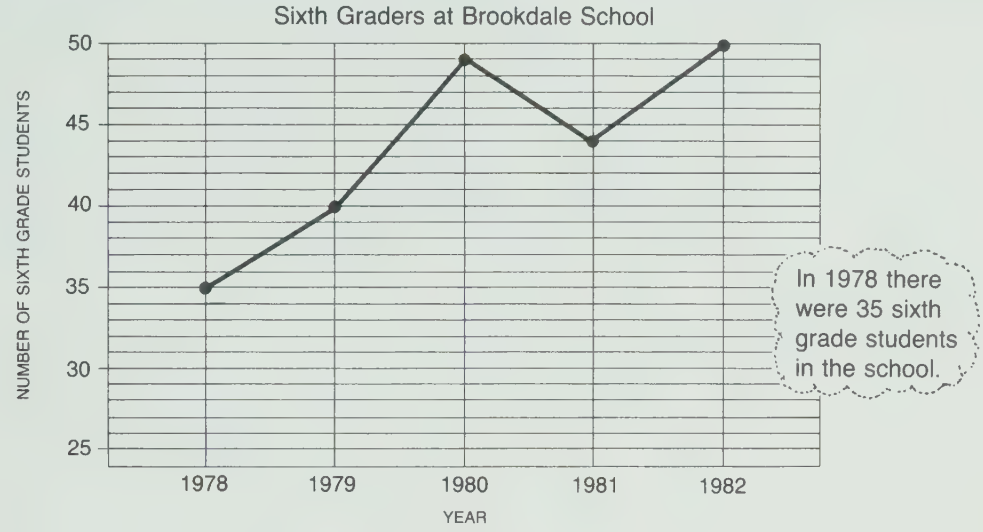
A (8,10)
B (8,12)
C (6,14)
D (4,14)
E (2,12)
F (2,10)
G (5,1)
H (8,10)
I (2,10)
J (7,7)
K (4,4)
L (6,4)
M (3,7)
A (8,10)



(4,0) (6,6) (3,5)

Broken-Line Graphs

Brookdale School opened in 1978. The points on the line graph show the number of students in the sixth grade during each year since then. The points can be connected to show an increase or decrease from one year to next.

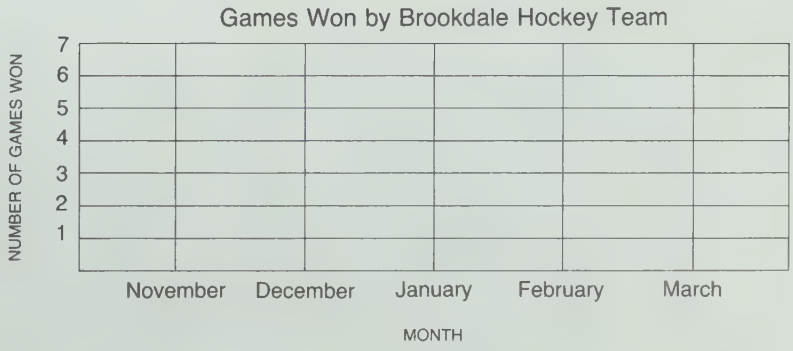


Use the graph above to answer the questions.

1. How many sixth graders attended the school in 1980? _____
2. Between which two years did the sixth grade population increase the most? _____
3. Between which two years did the sixth grade population decrease? _____
4. How many more sixth graders attended Brookdale School in 1982 than in 1979? _____
5. In which year were there 50 sixth grade students? _____

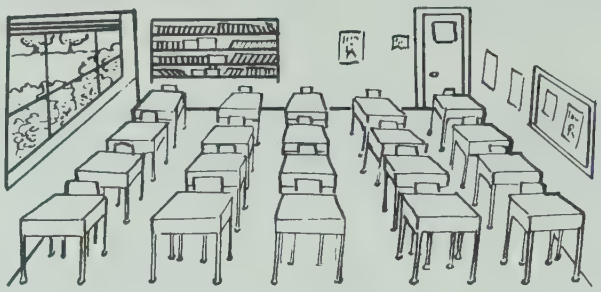
The chart shows the number of games that the Brookdale School hockey team won during a five-month season. Make a broken-line graph to show the number of games won from November to March.

Month	Number of Wins
November	6
December	2
January	4
February	3
March	5



Basic Multiplication Facts

Mrs. Huber's classroom has 5 rows of desks with 4 desks in each row. How many desks are there in the classroom?



We can add.
$4 + 4 + 4 + 4 + 4 = 20$

We can multiply.
$5 \times 4 = 20$

There are 20 desks in all.

Multiply.

1. $6 \times 2 =$ ____ **2.** $4 \times 6 =$ ____ **3.** $7 \times 1 =$ ____ **4.** $8 \times 5 =$ ____

5. $9 \times 7 =$ ____ **6.** $7 \times 9 =$ ____ **7.** $8 \times 8 =$ ____ **8.** $0 \times 9 =$ ____

9. $1 \times 1 =$ ____ **10.** $5 \times 0 =$ ____ **11.** $5 \times 5 =$ ____ **12.** $3 \times 4 =$ ____

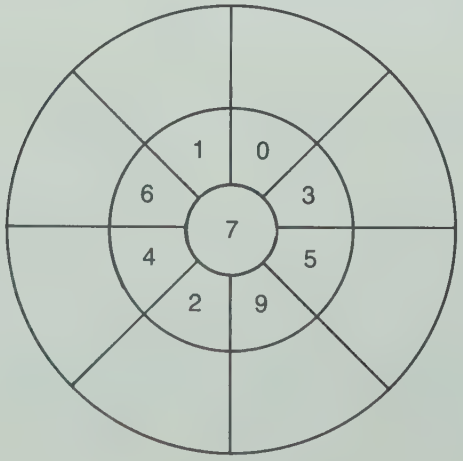
Complete to make true statements. For some problems there is more than one correct answer.

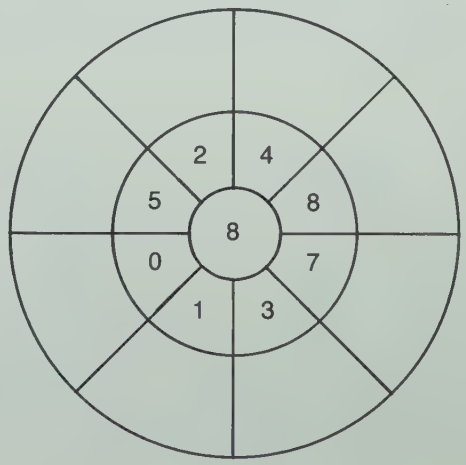
13. $5 \times 3 =$ ____ **14.** ____ $\times 6 = 18$ **15.** ____ $\times$ ____ $= 4$

16. $0 \times 6 =$ ____ **17.** ____ $\times$ ____ $= 0$ **18.** ____ $\times 8 = 24$

19. $9 \times$ ____ $= 36$ **20.** $6 \times 6 =$ ____ **21.** ____ $\times$ ____ $= 0$

Complete each number wheel. Multiply each number by the number in the middle.





15 63 4 1 12 0

Multiplying by a One-Digit Number

John collects postage stamps. He has 4 books with 135 stamps in each book. How many stamps does he have?

Multiply the ones.

$$\begin{array}{r} {\scriptstyle 2} \\ 135 \\ \times\ \ 4 \\ \hline 0 \end{array}$$

$5 \times 4 = 20$ ones
or 2 tens 0 ones.

Multiply the tens.

$$\begin{array}{r} {\scriptstyle 12} \\ 135 \\ \times\ \ 4 \\ \hline 40 \end{array}$$

4×3 tens $= 12$ tens.
2 more tens make
14 tens
or 1 hundred 4 tens.

Multiply the hundreds.

$$\begin{array}{r} {\scriptstyle 12} \\ 135 \\ \times\ \ 4 \\ \hline 540 \end{array}$$

4×1 hundred
$= 4$ hundreds.
1 more hundred makes
5 hundreds.

John has 540 stamps in his collection.

Multiply.

1. $\begin{array}{r} 21 \\ \times\ 4 \\ \hline \end{array}$ **2.** $\begin{array}{r} 19 \\ \times\ 3 \\ \hline \end{array}$ **3.** $\begin{array}{r} 132 \\ \times\ 2 \\ \hline \end{array}$ **4.** $\begin{array}{r} 149 \\ \times\ 3 \\ \hline \end{array}$

5. $\begin{array}{r} 800 \\ \times\ 6 \\ \hline \end{array}$ **6.** $\begin{array}{r} 621 \\ \times\ 7 \\ \hline \end{array}$ **7.** $\begin{array}{r} 314 \\ \times\ 8 \\ \hline \end{array}$ **8.** $\begin{array}{r} 1475 \\ \times\ 5 \\ \hline \end{array}$

9. A train travels at an average speed of 75 km/h. How many kilometres can it travel in 4 h? _____

10. A grocery store receives a shipment of 9 cases of soda. Each case contains 24 bottles. How many bottles are there altogether? _____

Here is a code.

2015	1086	350	184	224	960	2763	7924
M	U	N	A	L	B	E	R

What goes up when the rain comes down? Multiply to answer the riddle.

$\begin{array}{r} 46 \\ \times\ 4 \\ \hline \end{array}$	$\begin{array}{r} 175 \\ \times\ 2 \\ \hline \end{array}$	$\begin{array}{r} 362 \\ \times\ 3 \\ \hline \end{array}$	$\begin{array}{r} 403 \\ \times\ 5 \\ \hline \end{array}$	$\begin{array}{r} 160 \\ \times\ 6 \\ \hline \end{array}$	$\begin{array}{r} 1132 \\ \times\ 7 \\ \hline \end{array}$	$\begin{array}{r} 921 \\ \times\ 3 \\ \hline \end{array}$	$\begin{array}{r} 56 \\ \times\ 4 \\ \hline \end{array}$	$\begin{array}{r} 28 \\ \times\ 8 \\ \hline \end{array}$	$\begin{array}{r} 92 \\ \times\ 2 \\ \hline \end{array}$

Multiplying by Multiples of 10, 100, and 1000

Multiply 24 and 300.

Multiply by 0 ones.

$$\begin{array}{r} 24 \\ \times 300 \\ \hline 0 \end{array}$$

Multiply by 0 tens.

$$\begin{array}{r} 24 \\ \times 300 \\ \hline 00 \end{array}$$

Multiply by 3 hundreds.

$$\begin{array}{r} {\scriptstyle 1} \\ 24 \\ \times 300 \\ \hline 7200 \end{array}$$

3 hundreds × 24
= 72 hundreds or
7 thousand 2 hundreds.

The product of 24 and 300 is 7200.

Multiply.

1. $\begin{array}{r} 16 \\ \times 40 \\ \hline \end{array}$ **2.** $\begin{array}{r} 123 \\ \times 50 \\ \hline \end{array}$ **3.** $\begin{array}{r} 475 \\ \times 10 \\ \hline \end{array}$ **4.** $\begin{array}{r} 247 \\ \times 20 \\ \hline \end{array}$

5. $\begin{array}{r} 12 \\ \times 300 \\ \hline \end{array}$ **6.** $\begin{array}{r} 433 \\ \times 400 \\ \hline \end{array}$ **7.** $\begin{array}{r} 510 \\ \times 600 \\ \hline \end{array}$ **8.** $\begin{array}{r} 802 \\ \times 2000 \\ \hline \end{array}$

Multiply without showing your work.

9. 60 × 10 _____ **10.** 1000 × 12 _____ **11.** 44 × 100 _____

12. 566 × 100 _____ **13.** 100 × 208 _____ **14.** 2030 × 100 _____

Mystery Number

Multiply. Cross out each digit of the products in the number strip.
The digits left will form a multiple of 100 when put together.

0	1	0	2	0	2	0	3	0	0	5	0	0	6	0	0	0	9

15. $\begin{array}{r} 460 \\ \times 20 \\ \hline \end{array}$ **16.** $\begin{array}{r} 35 \\ \times 300 \\ \hline \end{array}$ **17.** $\begin{array}{r} 60 \\ \times 6000 \\ \hline \end{array}$

The number is _____ .

3600 640 600 56 600

Multiplying by a Two-Digit Number

The train ride at an amusement park can hold 45 passengers at a time. The train ride runs 15 times each day. How many passengers can the train carry in one day?

Multiply 45 and 15.

Multiply by the ones.

$$\begin{array}{r} {\scriptstyle 2} \\ 45 \\ \times\ 15 \\ \hline 225 \end{array}$$

Multiply by the tens.

$$\begin{array}{r} {\scriptstyle 2} \\ 45 \\ \times\ 15 \\ \hline 225 \\ 450 \end{array}$$

45 × 1 ten = 45 tens
= 4 hundreds 5 tens.

Add.

$$\begin{array}{r} 45 \\ \times\ 15 \\ \hline 225 \\ +\ 450 \\ \hline 675 \end{array}$$

675 passengers can ride the train in one day.

Round each factor to the nearest ten and estimate the product.

1. $\begin{array}{r} 46 \\ \times\ 24 \\ \hline \end{array}$ **2.** $\begin{array}{r} 87 \\ \times\ 91 \\ \hline \end{array}$ **3.** $\begin{array}{r} 11 \\ \times\ 55 \\ \hline \end{array}$

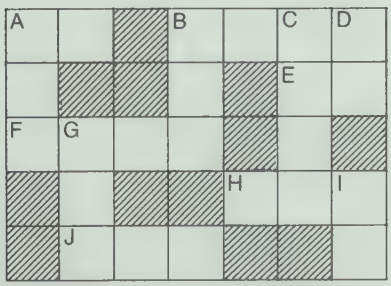
Multiply.

4. $\begin{array}{r} 23 \\ \times\ 12 \\ \hline \end{array}$ **5.** $\begin{array}{r} 78 \\ \times\ 24 \\ \hline \end{array}$ **6.** $\begin{array}{r} 97 \\ \times\ 35 \\ \hline \end{array}$ **7.** $\begin{array}{r} 501 \\ \times\ 19 \\ \hline \end{array}$

8. $\begin{array}{r} 125 \\ \times\ 42 \\ \hline \end{array}$ **9.** $\begin{array}{r} 370 \\ \times\ 36 \\ \hline \end{array}$ **10.** $\begin{array}{r} 1243 \\ \times\ 12 \\ \hline \end{array}$ **11.** $\begin{array}{r} 8049 \\ \times\ 72 \\ \hline \end{array}$

Complete the cross number puzzle.

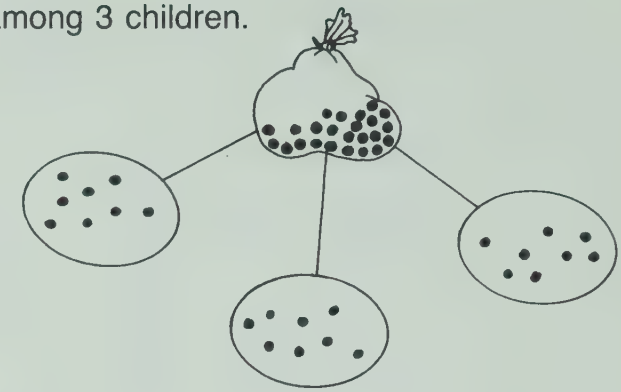
Across	Down
A. 8 × 7	A. 21 × 25
B. 102 × 37	B. 34 × 10
E. 9 × 8	C. 431 × 18
F. 52 × 100	D. 6 × 7
H. 18 × 16	G. 72 × 3
J. 32 × 20	I. 9 × 9



276 50 × 20 = 1000 5250

Using Multiplication to Divide

Eva has a bag of 24 marbles to divide evenly among 3 children.
How many marbles will each child get?



Divide 24 by 3.

$$\begin{array}{r} 8 \\ 3\overline{)24} \\ \underline{24} \\ 0 \end{array}$$

Think.
$3 \times \quad ? \quad = 24$
$3 \times \quad 8 \quad = 24.$

Each child will get 8 marbles.

Suppose the bag contains 26 marbles. How many will each child get if they are again divided evenly?

$$\begin{array}{r} 8 \text{ R2} \\ 3\overline{)26} \\ \underline{24} \\ 2 \end{array}$$

Think.
$3 \times 8 = 24.$

There is a remainder of 2.

Check by multiplying $3 \times 8 = 24$
Add the remainder $\rightarrow + 2$
Total number of marbles $\rightarrow 26$

Each child will get 8 marbles. There will be 2 extra marbles.

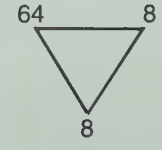
Divide. Check by multiplying.

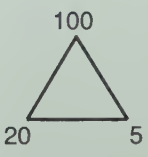
1. $6\overline{)18}$ **2.** $3\overline{)48}$ **3.** $5\overline{)28}$ **4.** $8\overline{)72}$

5. $9\overline{)29}$ **6.** $2\overline{)58}$ **7.** $7\overline{)68}$ **8.** $4\overline{)31}$

Triangle Combination

For each set of numbers in a triangle, write one division and one multiplication sentence.





_____ _____ _____

_____ _____ _____

3, $6 \times 3 = 18$ 3 R2, $9 \times 3 = 27 + 2 = 29$

Dividing by a One-Digit Number

Divide 486 by 4.

Divide 4 hundreds by 4.

$$\begin{array}{r} 1 \\ 4\overline{)486} \\ 400 \\ \hline 86 \end{array}$$

4 × 1 hundred

Divide 8 tens by 4.

$$\begin{array}{r} 12 \\ 4\overline{)486} \\ 400 \\ \hline 86 \\ 80 \\ \hline 6 \end{array}$$

4 × 2 tens

Divide 6 ones by 4.

$$\begin{array}{r} 121\ \text{R2} \\ 4\overline{)486} \\ 400 \\ \hline 86 \\ 80 \\ \hline 6 \\ 4 \\ \hline 2 \end{array}$$

4 × 1

The quotient is 121 R2.

Divide.

1. $3\overline{)36}$ **2.** $5\overline{)27}$ **3.** $8\overline{)76}$ **4.** $9\overline{)99}$

5. $2\overline{)246}$ **6.** $4\overline{)896}$ **7.** $7\overline{)793}$ **8.** $6\overline{)375}$

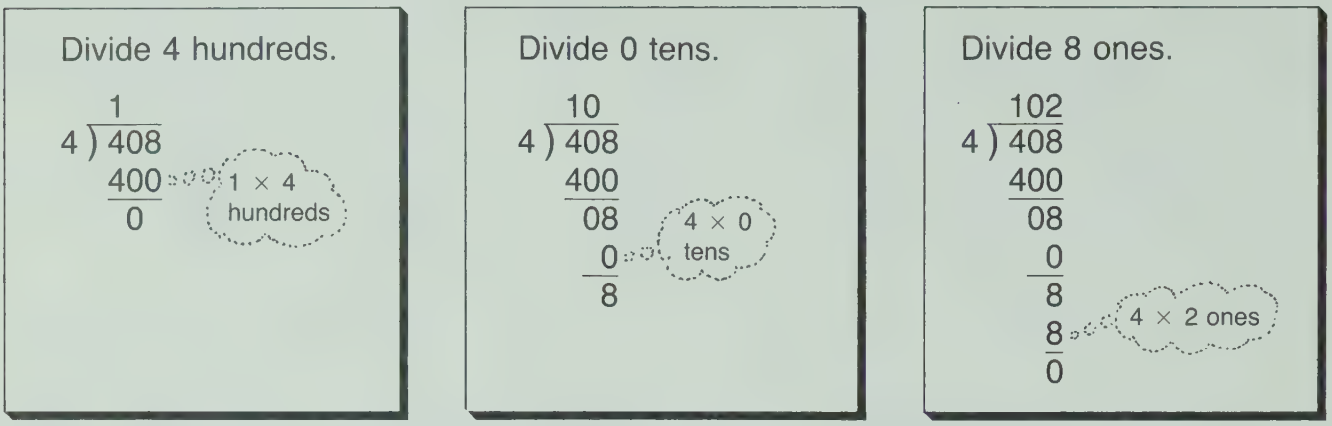
Tick-Tack-Toe

Divide. You win when you get 3 of the same quotients in a row.

$3\overline{)46}$	$5\overline{)28}$	$7\overline{)149}$
$6\overline{)72}$	$8\overline{)121}$	$9\overline{)64}$
$8\overline{)71}$	$2\overline{)63}$	$4\overline{)61}$

Zero in the Quotient

Divide 408 by 4.



The quotient is 102. Check by multiplying.

$$\begin{array}{r} 102 \\ \times \quad 4 \\ \hline 408 \end{array}$$

Divide. Check by multiplying.

1. $2\overline{)40}$ **2.** $3\overline{)90}$ **3.** $9\overline{)180}$

4. $5\overline{)504}$ **5.** $7\overline{)4907}$ **6.** $8\overline{)1603}$

For each row, circle the division example whose quotient is at the left.

102	$4\overline{)408}$	$4\overline{)480}$
301	$2\overline{)62}$	$2\overline{)602}$

130	$3\overline{)390}$	$3\overline{)309}$
402	$3\overline{)1260}$	$3\overline{)1206}$

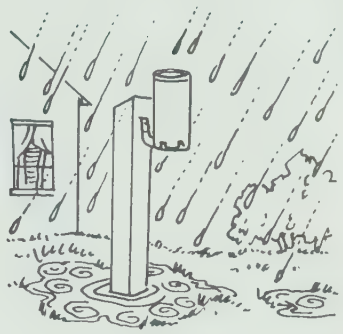
20, $20 \times 2 = 40$ 100 R4 100

$$\begin{array}{r} 5 \\ \times \\ \hline 500 \\ + \quad 4 \\ \hline 504 \end{array}$$

Finding the Average

The chart shows the amount of rain that fell in a certain city during 4 weeks in June.

	Rainfall
Week 1	10 cm
Week 2	8 cm
Week 3	9 cm
Week 4	6 cm



Find the average number of centimetres of rain that fell weekly.

Add the number of centimetres.

$10 + 8 + 9 + 6 = 32$ cm

Divide by the number of weeks.

$$4\overline{)32} \quad 8$$

An average of 8 cm of rain fell each week.

Find the average for each set of numbers.

1. 6, 12 _____

2. 8, 15, 22 _____

3. 21, 46, 85, 92 _____

4. 105, 112, 116 _____

5. 9, 9, 9, 9, 9 _____

6. $42, $56, $68, $86, $93 _____

7. During one year in Toronto, it rained an average of 63 mm in January, 57 mm in February and 66 mm in March. What was the average rainfall for these months? _____

8. In 6 classes there are 20, 25, 28, 29, 30 and 24 children. What is the average number of children in each class? _____

9. Mrs. Walters grades her students by finding the average of their test scores. Using the test scores below, find out which student gets the highest grade.

Jack	Terry	Sumi	Sam
85	93	65	94
92	69	100	67
72	84	90	85

111 9 62 mm

Dividing by Multiples of 10

Divide 4680 by 60.

Divide the 468 tens.

$$\begin{array}{r} 7 \\ 60\overline{)\,4680} \\ 420 \\ \hline 480 \end{array}$$

$60 \times 7 = 420$
$60 \times 8 = 480$, which is too large.

Divide the 480 ones.

$$\begin{array}{r} 78 \\ 60\overline{)\,4680} \\ 420 \\ \hline 480 \\ 480 \\ \hline 0 \end{array}$$

60×8

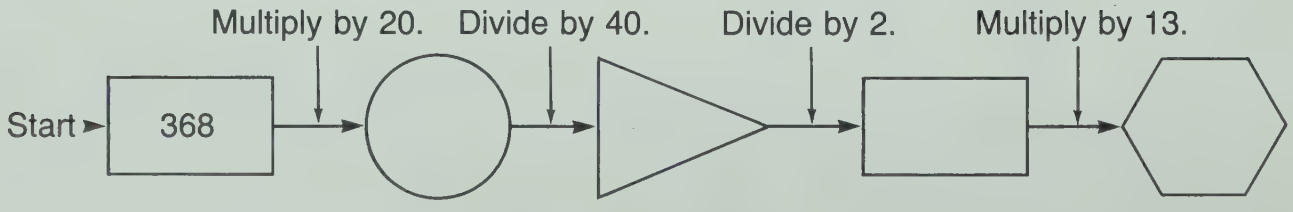
The quotient of 4680 and 60 is 78.

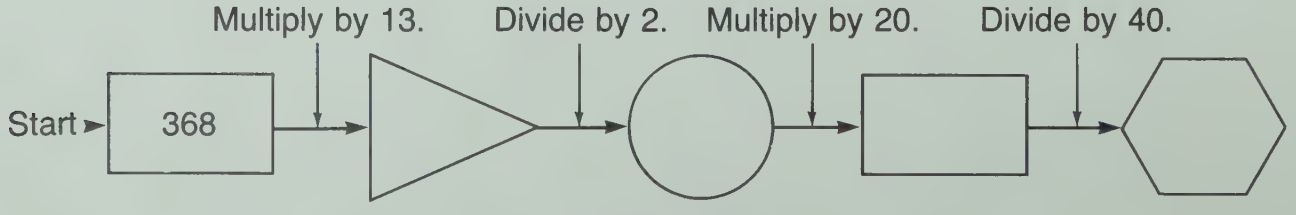
Divide.

1. $10\overline{)\,50}$ **2.** $20\overline{)\,380}$ **3.** $30\overline{)\,946}$ **4.** $10\overline{)\,604}$

5. $50\overline{)\,8750}$ **6.** $40\overline{)\,9260}$ **7.** $20\overline{)\,6906}$ **8.** $80\overline{)\,8004}$

Follow the two paths. What do you notice about the results?





Dividing by a Two-Digit Number

Divide 1374 by 22.

Divide the 137 tens.

$$\begin{array}{r} 6 \\ 22\overline{)1374} \\ \underline{132} \\ 5 \end{array}$$

round 22 to 20

$6 \times 20 = 120$
$7 \times 20 = 140$

Divide the 54 ones.

$$\begin{array}{r} 62\text{ R10} \\ 22\overline{)1374} \\ \underline{132} \\ 54 \\ \underline{44} \\ 10 \end{array}$$

$2 \times 20 = 40$
$3 \times 20 = 60$

$1374 \div 22 = 62\text{ R10}$. Check by multiplying. $62 \times 22 = 1364 + 10 = 1374$.

Divide. Check by multiplying.

1. $21\overline{)84}$ **2.** $18\overline{)20}$ **3.** $37\overline{)95}$ **4.** $43\overline{)921}$

5. $12\overline{)372}$ **6.** $26\overline{)642}$ **7.** $23\overline{)4692}$ **8.** $52\overline{)4953}$

9. There are 768 seats in a theatre. There are 24 seats in each row. How many rows are there? _____

Break the Code

Each letter stands for a digit. Find the digit that goes with each letter to make the division work.

$$\begin{array}{r} \text{CB} \\ 21\overline{)79\text{B}} \\ \underline{63} \\ \text{A6B} \\ \underline{\text{A6B}} \\ 0 \end{array}$$

A = _____

B = _____

C = _____

4, $21 \times 4 = 84$ 31, $31 \times 12 = 372$ 32

Dividing by a Two-Digit Number

Divide 708 by 24.

Divide the 70 tens.

$$24 \overline{)\,708}\quad \text{quotient } 3,\ \text{subtract } 72$$

Think: 20

Round 24 to 20.
Think. $3 \times 20 = 60$.
$4 \times 20 = 80$.
But $3 \times 24 = 72$, which is too big!

Try again.

$$24 \overline{)\,708}\quad \text{quotient } 2,\ \text{subtract } 48,\ \text{remainder } 228$$

Divide the 228 ones.

$$24 \overline{)\,708}\quad \text{quotient } 29,\ \text{subtract } 48,\ 228,\ 216,\ \text{remainder } 12$$

Think.
$9 \times 20 = 180$

$708 \div 24 = 29\ \text{R}12$

Round each dividend and divisor. Estimate each quotient.
Then find the exact quotient.

1. $48 \overline{)\,504}$

2. $21 \overline{)\,796}$

3. $29 \overline{)\,901}$

Divide.

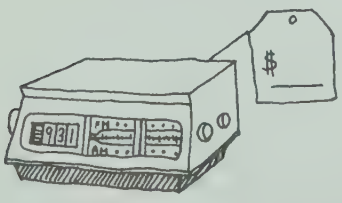
4. $32 \overline{)\,924}$

5. $16 \overline{)\,678}$

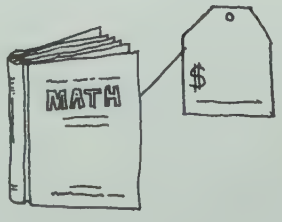
6. $48 \overline{)\,3604}$

Find the Missing Prices.

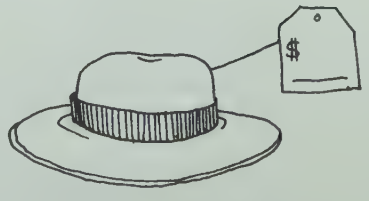
Help the storekeeper by labelling each item. The bills are below each item.



Item	Total Cost
14 radios	$266



Item	Total Cost
37 books	$407

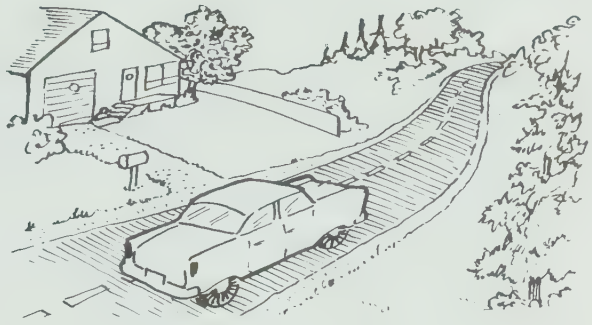


Item	Total Cost
80 hats	$2080

28 R28

10 R24

Adding Decimals



A salesman drove 31.7 km on Monday, 62.8 km on Tuesday, and 52.93 km on Wednesday. What was the total distance he travelled during these three days?

Add 31.7, 62.8, and 52.93.

Rewrite the decimals vertically. Remember to line up the decimal points.

Add the hundredths.	Add the tenths. Regroup.	Add the ones.	Add the tens. Regroup.
31.7 62.8 + 52.93 3	2 31.7 62.8 + 52.93 .43	2 31.7 62.8 + 52.93 7.43	2 31.7 62.8 + 52.93 147.43

The salesman drove 147.43 km.

Add.

1. 6.5 + 3.4

2. 4.6 + 0.9

3. 12.7 + 14.82

4. 25.83 + 36.42

5. 90.15 + 91.05

6. 5.4 + 4.3 + 8.2

7. 12.47 + 38.05 + 6.13

8. 14.8 + 16.007 + 13.05

9. 27.6 + 14.67 + 3.051

10. 0.72 + 0.8 + 1.09

11. 12.1 + 13.57 + 6.009 + 0.52 = _____

Special Sums

Add across and down. Then find the sum in the corner box.

+ → / ↓			
	1.43	3.8	
	2.475	0.12	

+ → / ↓			
	4.6	0.32	
	0.9	15.1	

9.9 32.199 17.9

Subtracting Decimals

Subtract 2.413 from 3.

Rewrite 3 as 3.000, so that both decimals have the same number of places.	Regroup.	Subtract.
3.000 − 2.413	2.9 9 10 ~~3~~.~~0~~~~0~~~~0~~ − 2.413	2.9 9 10 ~~3~~.~~0~~~~0~~~~0~~ − 2.413 0.587

The difference is 0.587.

Subtract. Add to check.

1. 6.7 − 4.2

2. 10.89 − 7.96

3. 6.07 − 5.70

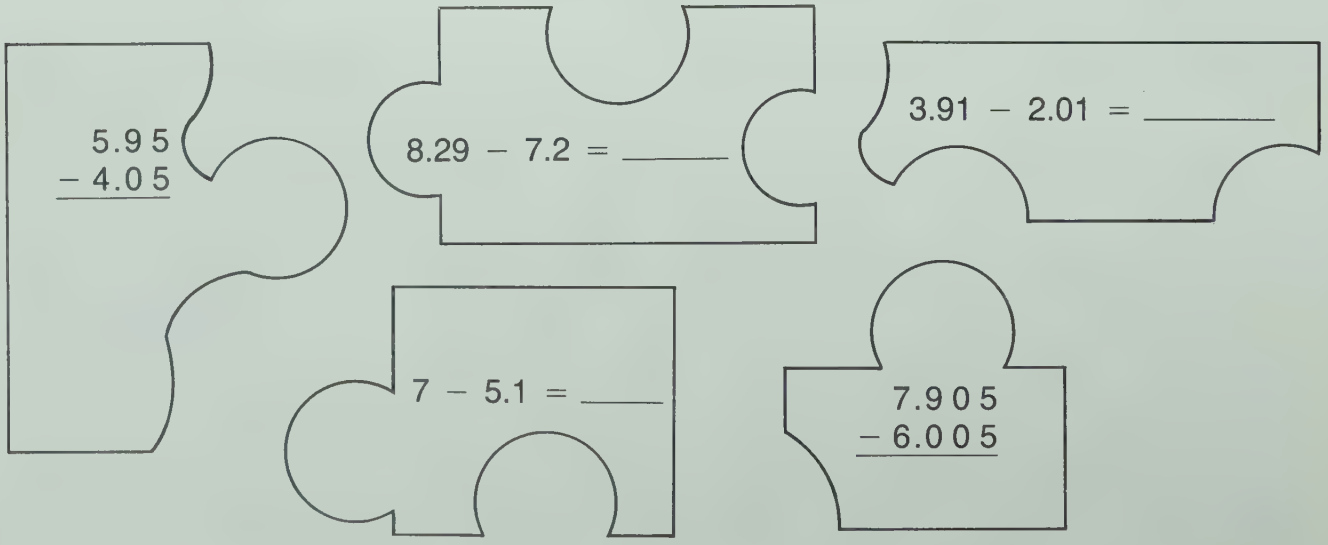
4. 12.34 − 7 = _____

5. 4 − 0.005 = _____

6. Jane took $20 to the grocery store. She spent $14.86.
How much change did she receive? _____

It's a Puzzle

One puzzle piece does not belong with the other four. Which one is it?
Subtract to find out.



$5.14 2.5, 2.5 5.34

4.2
6.7

Rounding Decimals

Round 2.463 to the nearest one, tenth, and hundredth.

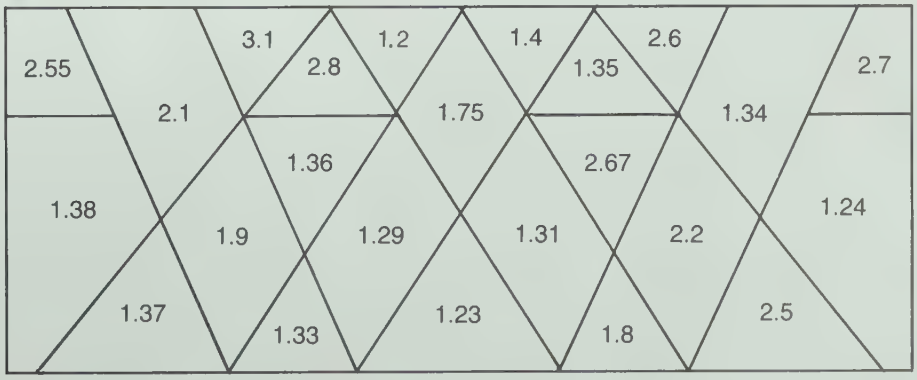
Round to the nearest	What is the digit to the right of the rounding place?	Is it 5 or more?	Round
one	4	no	down to 2
tenth	6	yes	up to 2.5
hundredth	3	no	down to 2.46

Complete the chart.

		Round to the nearest		
	Number	one	tenth	hundredth
1.	3.354			
2.	7.581			
3.	3.905			
4.	0.006			
5.	12.455			
6.	14.796			
7.	22.298			
8.	16.339			

Hidden Letter

Shade all shapes whose numbers when rounded to the nearest whole number equal 2.
Shade all shapes whose numbers when rounded to the nearest tenth equal 1.3.



3, 3.4, 3.35

Estimating Sums and Differences

Estimate the sum of $14.95, $21.75, and $9.29. Round each number to the nearest one and add.

$$\begin{array}{rcr} \$14.95 & \rightarrow & \$15.00 \\ 21.75 & \rightarrow & 22.00 \\ +\ 9.29 & \rightarrow & 10.00 \\ \hline \$45.99 & & \$47.00 \end{array}$$

The estimated sum is $47.00.
The exact sum is $45.99.

Estimate the difference of 0.937 and 0.456. Round each number to the nearest tenth and subtract.

$$\begin{array}{rcr} 0.937 & \rightarrow & 0.9 \\ -\ 0.456 & \rightarrow & 0.5 \\ \hline 0.481 & & 0.4 \end{array}$$

The estimated difference is 0.4.
The exact difference is 0.481.

When estimating, round all numbers greater than one to the nearest whole number. Round all numbers less than one to the nearest tenth unless otherwise indicated.

Estimate. Then find the exact sum or difference.

1. $\begin{array}{r} 9.3 \\ 6.5 \\ +\ 8.7 \\ \hline \end{array}$

2. $\begin{array}{r} \$16.75 \\ 9.06 \\ +\ 23.59 \\ \hline \end{array}$

3. $\begin{array}{r} 0.846 \\ 0.732 \\ +\ 0.696 \\ \hline \end{array}$

4. $\begin{array}{r} 86.9 \\ -\ 47.5 \\ \hline \end{array}$

5. $\begin{array}{r} 6.49 \\ -\ 6.01 \\ \hline \end{array}$

6. $\begin{array}{r} 8.000 \\ -\ 5.324 \\ \hline \end{array}$

Unscramble the Letters

Estimate. Use your estimate to pick the exact answer in the code.
Place the letter of the problem under the exact answer.

1.5	6.2	2.637	2.637	2.33	1.5	4.7

R. $\begin{array}{r} 3.875 \\ -\ 1.238 \\ \hline \end{array}$

T. $\begin{array}{r} 1.2 \\ 1.6 \\ +\ 1.9 \\ \hline \end{array}$

O. $\begin{array}{r} 86.05 \\ -\ 79.85 \\ \hline \end{array}$

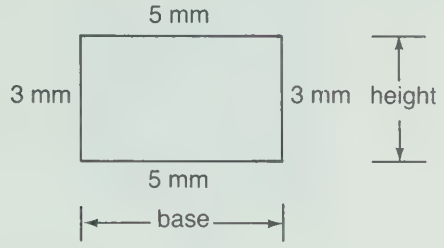
C. $\begin{array}{r} 0.096 \\ 0.998 \\ +\ 0.375 \\ \hline \end{array}$

E. $\begin{array}{r} 12 \\ -\ 9.67 \\ \hline \end{array}$

24.5, 25 39.4, 39

Using a Rule to Find Perimeter

Find the perimeter of the rectangle.



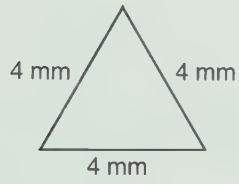
$3 + 5 + 3 + 5 = 16$
or $(2 \times 3) + (2 \times 5) = 16$

The perimeter is 16 mm.

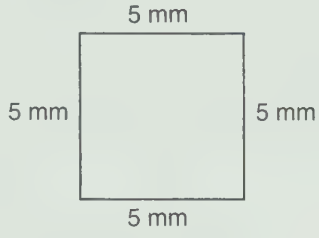
We can use this rule:

> Perimeter of a rectangle = (2 × base) + (2 × height).

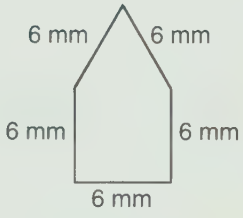
Find the perimeter of these regular polygons.



$4 + 4 + 4$
or $3 \times 4 = 12$
$P = 12$ mm



$5 + 5 + 5 + 5$
or $4 \times 5 = 20$
$P = 20$ mm



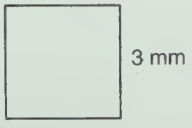
$6 + 6 + 6 + 6 + 6$
or $5 \times 6 = 30$
$P = 30$ mm

We can use this rule:

> Perimeter of regular polygon = length of one side × number of sides.

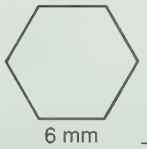
Find the perimeter of each figure.

1.



_____

2.

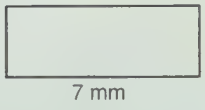


_____

3.

_____

4.



_____

The perimeter of each regular polygon is given. Find the length of one side of each polygon.

5.

_____

6.

_____

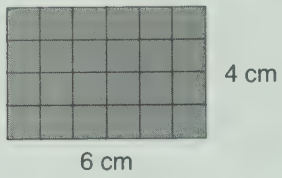
7.

_____

10 mm 12 mm

Using a Rule to Find Area

Find the area of the rectangle.



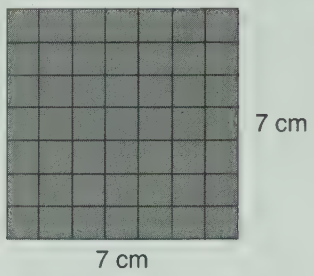
We can count 24 boxes or multiply.

base × height

$6 \times 4 = 24$

Area = 24 cm²

Find the area of the square.



We can count 49 boxes or multiply.

side × side

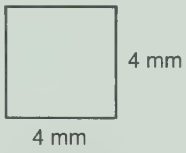
$7 \times 7 = 49$

Area = 49 cm²

> Area of a rectangle = base × height.
> Area of a square = side × side.

Find the area of each figure.

1.



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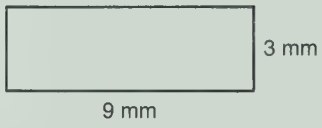
2.



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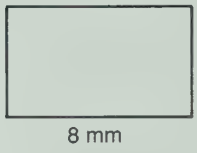
3.



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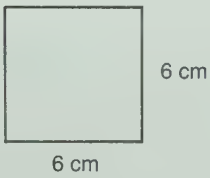
4.



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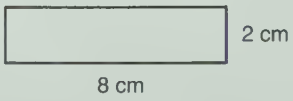
5.



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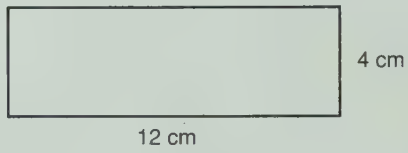
6.



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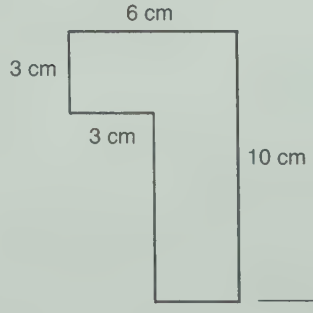
Find the area of each figure. Hint: draw lines to divide each figure into rectangles or squares.

7.



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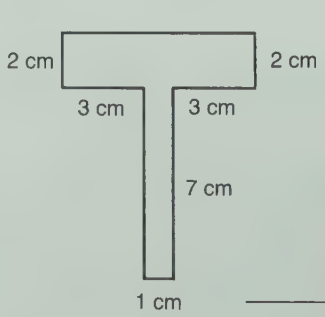
8.



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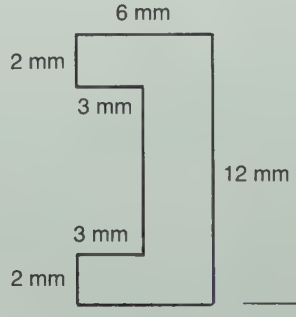
9.



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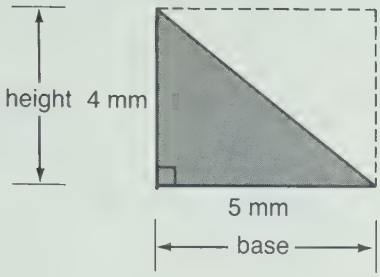
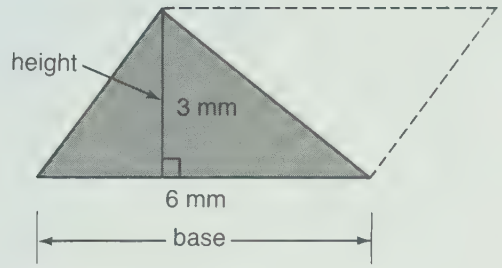
36 cm² 16 mm² 39 cm²

Finding the Area of a Triangle

Find the area of these triangles.



Area of the rectangle
$= 5 \text{ mm} \times 4 \text{ mm}$
$= 20 \text{ mm}^2$
Since the triangle is half the rectangle, its area is 10 mm^2.

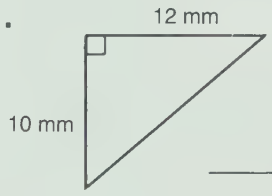


Area of the parallelogram
$= 6 \text{ mm} \times 3 \text{ mm}$
$= 18 \text{ mm}^2$
Since the triangle is half the parallelogram, its area is 9 mm^2.

$$\text{Area of a triangle} = \frac{\text{base} \times \text{height}}{2}.$$

Find the area of each triangle.

1.



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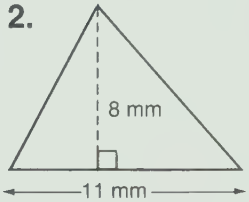
2.



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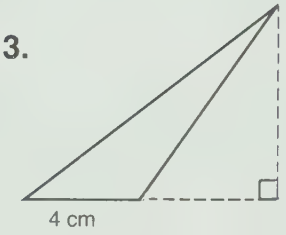
3.



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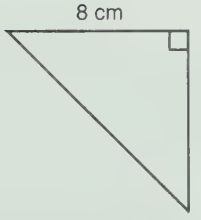
4.



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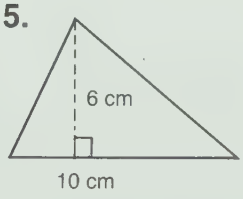
5.



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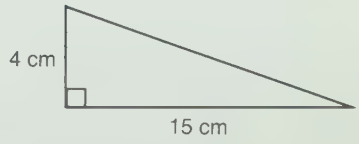
6.



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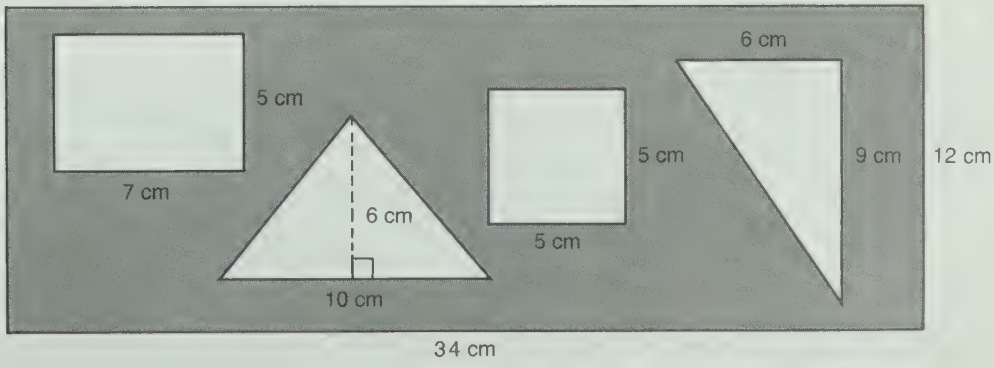
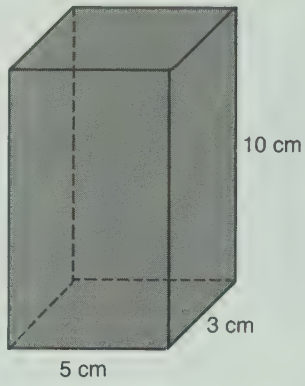
Find the area of the shaded region.

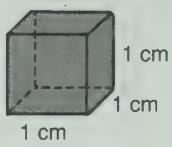


Finding the Volume of a Rectangular Prism

How many centimetre cubes can fit in the box?

Find the volume.





The area of the base is 5 cm × 3 cm or 15 cm^2.

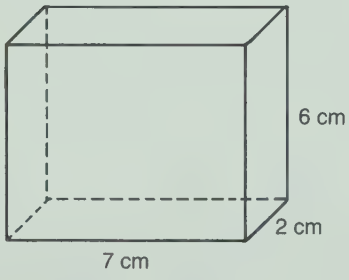
Area of the base × height of the box = 15 cm^2 × 10 cm = 150 cm^3

150 cubic centimetres can fit into the box. The volume is 150 cm^3.

> Volume of a rectangular prism = Area of the base × height.

Find the volume of each rectangular prism.

1.



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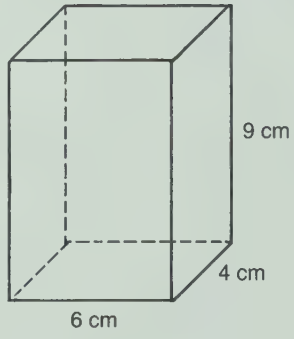
2.



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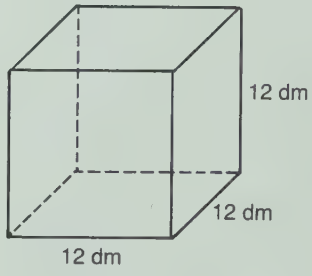
3.



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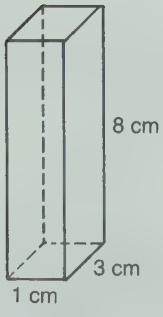
4.



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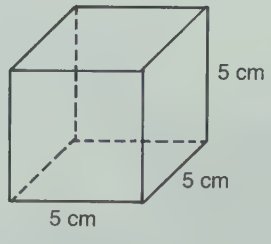
5.



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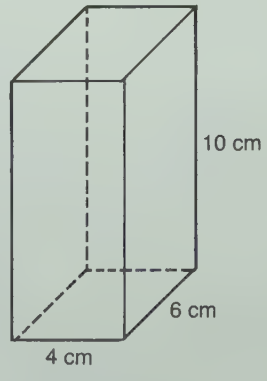
6.



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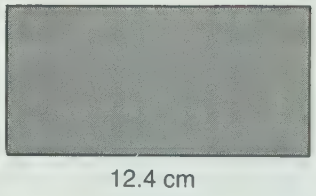
24 cm^3 84 cm^3

Multiplying Decimals and Whole Numbers

Find the area of a rectangle whose base is 12.4 cm and whose height is 6 cm.



Multiply 12.4 × 6.

Multiply.	Place the decimal point.
1 2 1 2 4 × 6 7 4 4	1 2.4 ← 1 decimal place × 6 ← + 0 decimal places 7 4.4 ← 1 decimal place

The area of the rectangle is 74.4 cm².

Multiply.

1. 7.3 × 4

2. 18.7 × 6

3. 9.25 × 2

4. $12.45 × 3

5. 6.7 × 32

6. 12.52 × 13

7. 5.396 × 6

8. 2.091 × 45

9. A runner jogs 3.5 km in one day. How many kilometres does she jog in one week? _____

Here is a code.

27.6	18.5	54.84	10.05	50.6	35.6
R	F	C	I	T	E

What is the message? Multiply.

4.6 × 11	8.9 × 4	0.2 × 3	4.6 × 6	1.005 × 10	3.7 × 5	2.01 × 5	4.57 × 12

29.2 214.4

Multiplying Tenths

Multiply 4.7 and 3.5.

Multiply by the tenths.

$$\begin{array}{r} {\scriptstyle 3} \\ 4.7 \\ \times\ 3.5 \\ \hline 235 \end{array}$$

47 × 5

Multiply by the ones.

$$\begin{array}{r} {\scriptstyle 3} \\ 4.7 \\ \times\ 3.5 \\ \hline 235 \\ 141 \\ \hline \end{array}$$

47 × 3

Add and place the decimal point.

$$\begin{array}{r} {\scriptstyle 3} \\ 4.7 \leftarrow \text{1 decimal place} \\ \times\ 3.5 \leftarrow \text{1 decimal place} \\ \hline 235 \\ 141 \\ \hline 16.45 \leftarrow \text{2 decimal places} \end{array}$$

The product is 16.45.

Place the decimal point in each product.

1. $\begin{array}{r} 3.2 \\ \times\ 1.5 \\ \hline 480 \end{array}$ **2.** $\begin{array}{r} 5.1 \\ \times\ 0.2 \\ \hline 102 \end{array}$ **3.** $\begin{array}{r} 15.7 \\ \times\ 4.3 \\ \hline 6751 \end{array}$ **4.** $\begin{array}{r} 62.5 \\ \times\ 14 \\ \hline 8750 \end{array}$

Multiply.

5. $\begin{array}{r} 6.3 \\ \times\ 1.7 \\ \hline \end{array}$ **6.** $\begin{array}{r} 8.4 \\ \times\ 0.1 \\ \hline \end{array}$ **7.** $\begin{array}{r} 19.5 \\ \times\ 2.5 \\ \hline \end{array}$ **8.** $\begin{array}{r} 29.3 \\ \times\ 24 \\ \hline \end{array}$

Find the area and perimeter of this rectangle.

10.71 4.80

Two Decimal Factors, Products Less Than 1

A rectangular shelf is 0.62 m long and 0.5 m wide. How much paper is needed to cover the top of the shelf?

Multiply 0.62 × 0.5.

Multiply by the tenths.

$$\begin{array}{r} {\scriptstyle 1} \\ 0.62 \\ \times\ 0.5 \\ \hline 0310 \end{array}$$

62 × 5

Place the decimal point.

$$\begin{array}{rl} {\scriptstyle 1} & \\ 0.62 & \leftarrow \text{ 2 decimal places} \\ \times\ 0.5 & \leftarrow + \text{ 1 decimal place} \\ \hline 0.310 & \leftarrow \text{ 3 decimal places} \end{array}$$

0.310 m^2 of paper will be needed.

Place the decimal point in each product.

1. $\begin{array}{r} 0.44 \\ \times\ 0.3 \\ \hline 132 \end{array}$ **2.** $\begin{array}{r} 0.34 \\ \times 0.56 \\ \hline 1984 \end{array}$ **3.** $\begin{array}{r} 0.75 \\ \times 0.02 \\ \hline 150 \end{array}$ **4.** $\begin{array}{r} .005 \\ \times\ 0.3 \\ \hline 15 \end{array}$

Multiply

5. $\begin{array}{r} 0.9 \\ \times 0.6 \end{array}$ **6.** $\begin{array}{r} 0.42 \\ \times 0.01 \end{array}$ **7.** $\begin{array}{r} 0.73 \\ \times 0.22 \end{array}$ **8.** $\begin{array}{r} 0.096 \\ \times\ 0.09 \end{array}$

9. Apples cost $150/kg. How much will 0.74 kg cost? _____

10. Grapes cost $3.89/kg. How much will 0.5 kg cost? _____

Here is a code.

0.0153	0.3653	0.12	0.06	0.014	0.0067
D	W	K	G	R	O

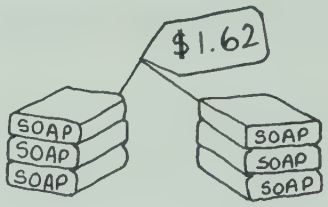
What is the message? Multiply.

$\begin{array}{r} 0.3 \\ \times 0.2 \end{array}$	$\begin{array}{r} 0.67 \\ \times 0.01 \end{array}$	$\begin{array}{r} 0.067 \\ \times\ .10 \end{array}$	$\begin{array}{r} 0.51 \\ \times 0.03 \end{array}$

$\begin{array}{r} 0.09 \\ \times 4.07 \end{array}$	$\begin{array}{r} 0.134 \\ \times\ 0.05 \end{array}$	$\begin{array}{r} 0.07 \\ \times\ 0.2 \end{array}$	$\begin{array}{r} 0.4 \\ \times 0.3 \end{array}$

$1.11 0.54 0.132

Dividing by a One-Digit Number



Six bars of soap cost $1.62.
How much does each bar of soap cost?

Divide $1.62 by 6.

Divide 162 by 6.

$$\begin{array}{r} 0\,27 \\ 6\overline{)\,1.62} \\ \underline{1\,2} \\ 42 \\ \underline{42} \\ 0 \end{array}$$

Place the decimal point.

$$\begin{array}{r} 0.27 \\ 6\overline{)\,1.62} \\ \underline{1\,2} \\ 42 \\ \underline{42} \\ 0 \end{array}$$

Each bar of soap costs $0.27.

Divide.

1. $5\overline{)\,2.5}$ **2.** $7\overline{)\,4.9}$ **3.** $4\overline{)\,1.64}$ **4.** $6\overline{)\,0.006}$

5. $2\overline{)\,12.64}$ **6.** $8\overline{)\,7.28}$ **7.** $9\overline{)\,81.936}$ **8.** $3\overline{)\,10.482}$

Circle the correct quotient. It is not necessary to do each division exercise.

	Problem	Quotients		
9.	$3\overline{)\,1.2}$	0.40	4.0	0.4
11.	$7\overline{)\,5.6}$	80	8	0.8
13.	$2\overline{)\,0.006}$	0.3	0.03	0.003

	Problem	Quotients		
10.	$5\overline{)\,0.05}$	10	0.1	0.01
12.	$9\overline{)\,81.72}$	9.8	9.08	0.908
14.	$8\overline{)\,0.648}$	0.081	0.81	0.801

6.32 0.5 0.40

Dividing by a Two-Digit Number

Divide 156.5 by 25.

Divide 156.5 by 25.

$$\begin{array}{r} \mathbf{6} \\ \mathbf{25}\overline{)\,\mathbf{156}.5} \\ \underline{\mathbf{150}} \\ 6\,5 \end{array}$$

6 × 25

Place the decimal point and divide 65 by 25.

$$\begin{array}{r} 6.\mathbf{2} \\ \mathbf{25}\overline{)\,156.5} \\ \underline{150} \\ \mathbf{6\,5} \\ \underline{\mathbf{5\,0}} \\ 1\,5 \end{array}$$

2 × 25

Add a zero and continue dividing.

$$\begin{array}{r} 6.\mathbf{26} \\ \mathbf{25}\overline{)\,156.50} \\ \underline{150} \\ 6\,5 \\ \underline{5\,0} \\ 1\,50 \\ \underline{\mathbf{1\,50}} \\ 0 \end{array}$$

Remember 0.5 = 0.50

6 × 25

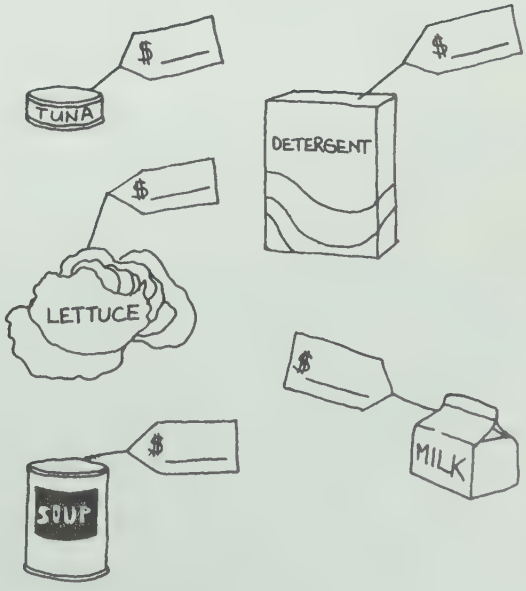
156.5 divided by 25 is 6.26.

Divide. Add zeros when necessary.

1. $12\overline{)\,37.2}$ **2.** $16\overline{)\,4.16}$ **3.** $24\overline{)\,112.8}$ **4.** $16\overline{)\,80.32}$

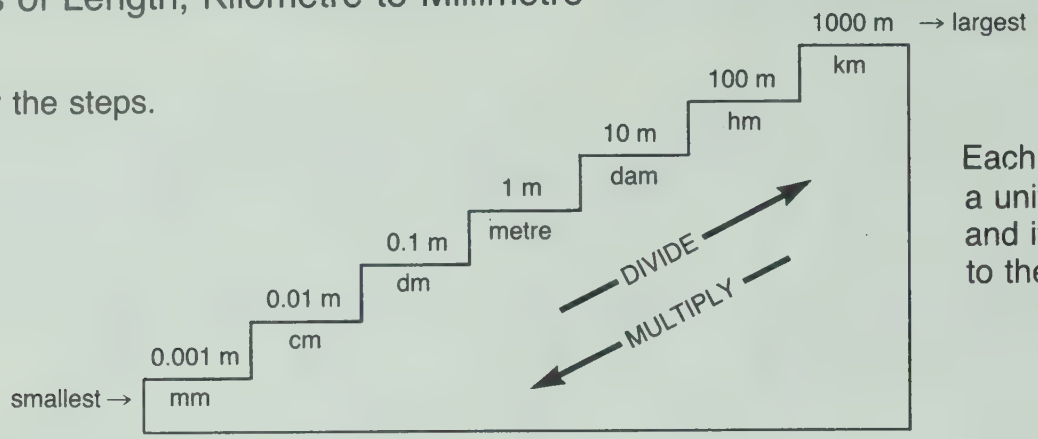
Use the bill to find the unit cost of each item. Then, total the bill.

Quantity	Item	Cost
12	cans of tuna	$16.68
26	boxes of detergent	$77.48
13	heads of lettuce	$ 8.97
30	containers of milk	$48.00
43	cans of soup	$10.75
	Total	



Units of Length, Kilometre to Millimetre

Study the steps.



Each step names a unit of length and its relationship to the metre.

We can change from one unit to another.

> Smaller → Larger: Divide by 10 for each step up.
> Larger → Smaller: Multiply by 10 for each step down.

3 m = 3000 cm

3 × 10 × 10
dm cm

6000 m = 6 km

6000 ÷ 10 ÷ 10 ÷ 10
dam hm km

Complete.

1. 4 m = _____ cm
2. 5000 mm = _____ m
3. 12 km = _____ m
4. 620 cm = _____ m
5. 47 dm = _____ m
6. 150 hm = _____ m
7. 14 m = _____ cm
8. 14 m = _____ dam
9. 14 m = _____ mm
10. 0.04 m = _____ cm
11. 60 m = _____ km
12. 5.8 m = _____ mm

Circle the longest length.

13. 5 mm, 5 cm, 5 m
14. 6 km, 50 hm, 4000 m
15. 12 mm, 5 cm, 0.03 m

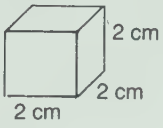
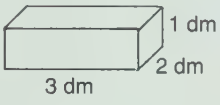
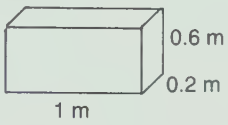
Match each item with the unit of length that you would use to measure it.

length of couch	millimetre
thickness of a piece of cardboard	centimetre
length of your thumb	metre
distance between Ottawa and Montreal	kilometre

4 5 m 400 6.2 1400

Volume, Capacity, and Mass

Find the volume, capacity, and mass of water for each container.

	Volume	Capacity	Mass	Relationships to Remember
	8 cm^3	8 mL (or 0.008 L)	8 g (or 0.008 kg)	1 cm^3 —capacity→ 1 mL 1 mL —mass→ 1 g
	6 dm^3	6 L (or 6000 mL)	6 kg (or 6000 g)	1 dm^3 —capacity→ 1 L 1 L —mass→ 1 kg
	0.12 m^3	0.12 kL (or 120 L)	0.12 t (or 120 kg)	1 m^3 —capacity→ 1 kL 1 kL —mass→ 1 t

Complete the table.

	Volume	Capacity	Mass of water
1.	5 cm^3	mL	g
2.	10 dm^3	L or mL	kg or g
3.	cm^3	mL or L	160 g
4.	cm^3	1200 mL or L	g
5.	0.6 m^3	kL	t or kg
6.	dm^3	22 L	kg
7.	dm^3	L or mL	4.6 kg
8.	3 dm^2	mL	g

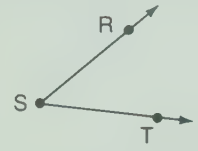
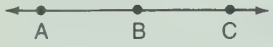
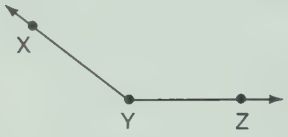
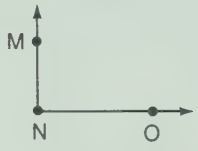
Match each item with the unit of measurement you would use to measure it.

child's wading pool	grams
mass of an orange	kilograms
can of orange juice	millilitres
mass of a desk	litres

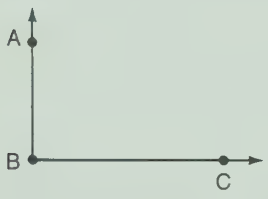
5 mL, 5 g

Angles

Study the chart.

	Angle name	Vertex	Type of angle
	∠RST	S	acute—greater than 0° and less than 90°
	∠ABC	B	straight—equal to 180°
	∠XYZ	Y	obtuse—greater than 90° and less than 180°
	∠MNO	N	right—equal to 90°

Measure each angle, name it, and classify it.

1. 

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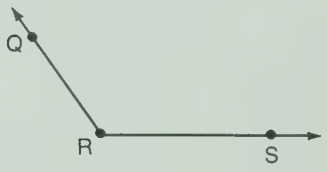
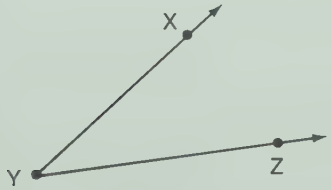
2. 

_____

3.

_____

4. 

_____

5.

_____

6.

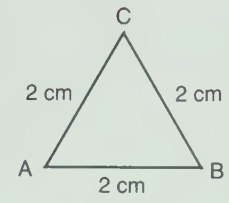
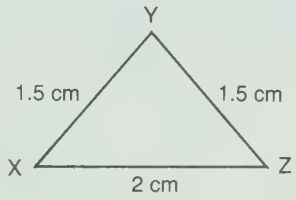
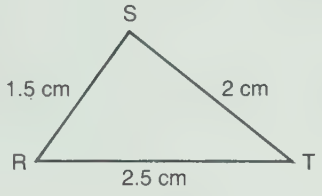
_____

Using a protractor, draw each angle on the back of this page.

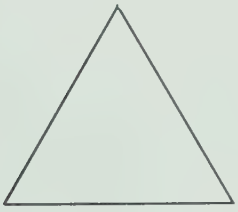
7. 62° **8.** 138° **9.** 12°

Triangles and Circles

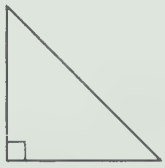
Study the chart.

	Name of triangle	Length of each side	Type of triangle
	∠ABC	2 cm each	equilateral— 3 equal sides
	∠XYZ	1.5 cm, 1.5 cm, 2 cm	isosceles— 2 equal sides
	∠RST	1.5 cm, 2.5 cm, 3 cm	scalene— no equal sides

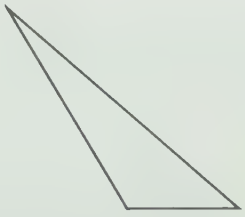
For each triangle, measure the sides and classify the triangle according to the length of the sides.

1. 

_____

2. 

_____

3. 

_____

Use the circle at the right.

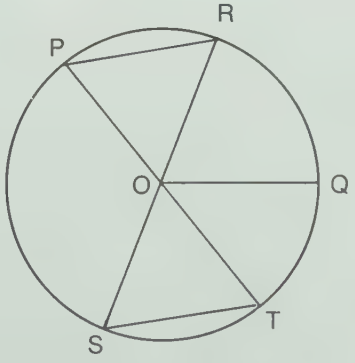
4. Name a radius. _____

5. Measure a radius. _____

6. Name a diameter. _____

7. Measure a diameter. _____

8. Name a chord. _____

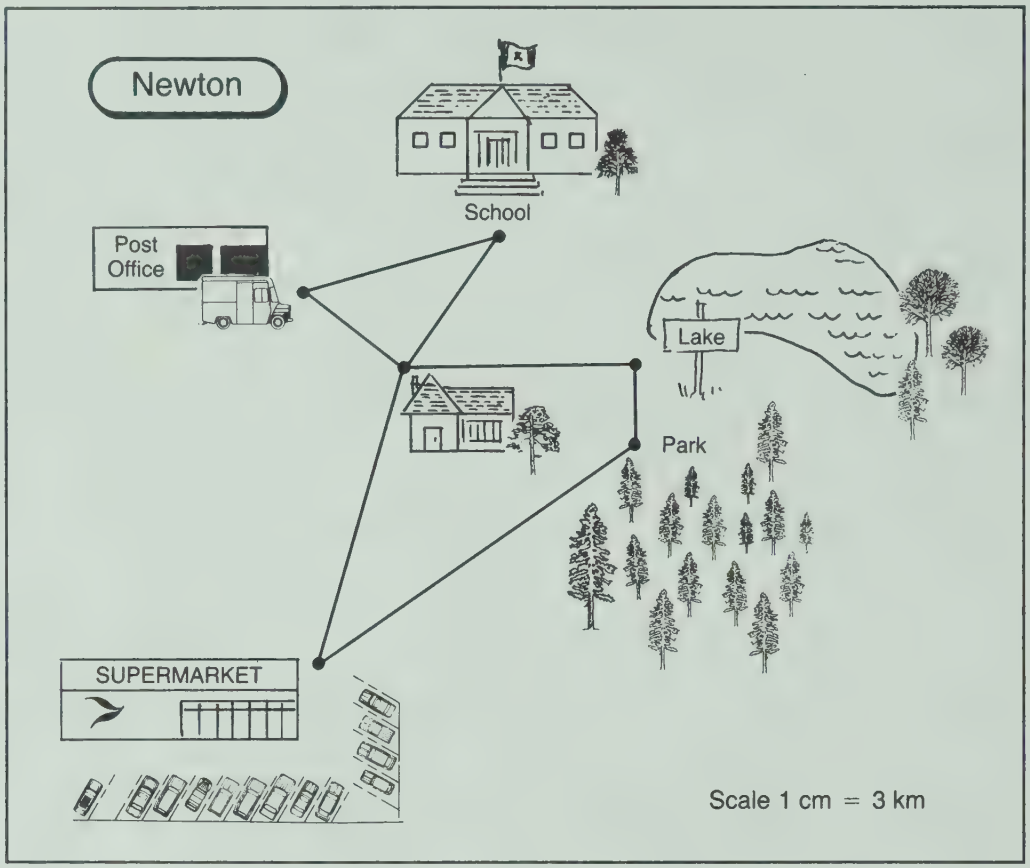


3 cm, equilateral

$\overline{OS}$, $\overline{OP}$, $\overline{OQ}$, $\overline{OT}$, $\overline{OR}$

Scale Drawings

Study the map of Newton, showing Jane Lauson's house.



Complete the chart. Measure the lines to find each distance. Then use the scale to find the real distances. The first one is done for you.

		Distance on the map	Real distance
1.	Jane's house to lake	3 cm	9 km (3 × 3 = 9)
2.	Jane's house to school		
3.	school to post office		
4.	lake to park		
5.	house to supermarket		
6.	park to supermarket		
7.	post office to house		

2 cm, 6 km

Factors, Common Factors, and Greatest Common Factors

Find the greatest common factor of 12 and 18.

Factors of 12	Factors of 18
2×6	2×9
3×4	3×6
12×1	18×1
The factors of 12 are 1, 2, 3, 4, 6, and 12.	The factors of 18 are 1, 2, 3, 6, 9, and 18.

The common factors are 1, 2, 3, and 6.
The greatest common factor is 6.

Write the factors for each number.

1. 8 _____ **2.** 24 _____

3. 20 _____ **4.** 30 _____

5. 25 _____ **6.** 50 _____

7. 7 _____ **8.** 60 _____

9. 48 _____

Magic Square

Find the greatest common factor for each pair. Write the answer in the correct box. The result will form a magic square. Add each row and column and the diagonal. The sums will all be equal.

A. 24, 32
B. 9, 11
C. 36, 42
D. 3, 18
E. 15, 25
F. 21, 28
G. 16, 20
H. 72, 81
I. 18, 100

A	D	G
B	E	H
C	F	I

_____ _____ _____ _____

_____

_____

_____

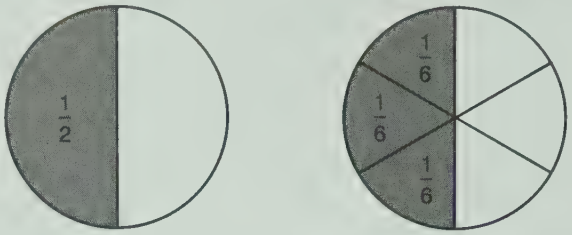
1, 2, 4, 8

1, 2, 3, 4, 6, 8, 12, 16, 24, 48

1, 5, 25

Multiplying or Dividing to Find Equivalent Fractions

Karen ate $\frac{1}{2}$ of a pie. Carmen ate $\frac{3}{6}$ of a pie of the same size. Who ate more?



The two girls ate the same amount of pie. $\frac{1}{2}$ and $\frac{3}{6}$ are equivalent fractions because they name the same amount.

We can find equivalent fractions by multiplying or dividing.

Multiply the numerator and the denominator by the same number.

$$\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$$

Divide the numerator and the denominator by their greatest common factor.

$$\frac{3}{6} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$$

This is in lowest terms.

Using multiplication, find 3 equivalent fractions for each.

1. $\frac{1}{2}$ _____ **2.** $\frac{3}{4}$ _____ **3.** $\frac{4}{5}$ _____

4. $\frac{9}{10}$ _____ **5.** $\frac{5}{7}$ _____ **6.** $\frac{8}{11}$ _____

Reduce each fraction to lowest terms.

7. $\frac{7}{14}$ _____ **8.** $\frac{9}{27}$ _____ **9.** $\frac{20}{30}$ _____ **10.** $\frac{16}{64}$ _____

11. $\frac{24}{36}$ _____ **12.** $\frac{25}{35}$ _____ **13.** $\frac{12}{18}$ _____ **14.** $\frac{28}{50}$ _____

In each row there are 3 equivalent fractions. Circle them.

15. $\frac{3}{4}$, $\frac{18}{24}$, $\frac{9}{12}$, $\frac{9}{16}$, $\frac{15}{21}$

16. $\frac{5}{8}$, $\frac{10}{12}$, $\frac{10}{16}$, $\frac{25}{40}$, $\frac{30}{49}$

17. $\frac{36}{80}$, $\frac{9}{20}$, $\frac{12}{27}$, $\frac{6}{20}$, $\frac{18}{40}$

18. $\frac{20}{40}$, $\frac{15}{18}$, $\frac{25}{30}$, $\frac{5}{6}$, $\frac{30}{50}$

$\frac{1}{2}$ $\frac{3}{4}$, $\frac{18}{24}$, $\frac{9}{12}$ $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$ $\frac{2}{3}$ $\frac{18}{20}$, $\frac{27}{30}$, $\frac{90}{100}$

Multiples, Common Multiples, and Least Common Multiples

Write the fractions $\frac{5}{12}$ and $\frac{7}{18}$ as equivalent fractions with like denominators.

Find the least common multiple of the denominators.

12 — Multiples are 12, 24, 36, 48, 60, 72, etc.

18 — Multiples are 18, 36, 54, 72, 90, etc.

The least common multiple is 36.

Use 36 as the common denominator.

$$\frac{5}{12} = \frac{5 \times 3}{12 \times 3} = \frac{15}{36} \qquad \frac{7}{18} = \frac{7 \times 2}{18 \times 2} = \frac{14}{36}$$

$\frac{15}{36}$ is equivalent to $\frac{5}{12}$, and $\frac{14}{36}$ is equivalent to $\frac{7}{18}$.

Find the least common multiple for each pair of numbers.

1. 4, 8 _____ **2.** 7, 21 _____ **3.** 20, 30 _____

4. 9, 7 _____ **5.** 24, 36 _____ **6.** 15, 25 _____

Find equivalent fractions with like denominators.

7. $\frac{3}{4}, \frac{1}{8}$ _____ **8.** $\frac{7}{16}, \frac{3}{24}$ _____ **9.** $\frac{4}{30}, \frac{1}{18}$ _____

10. $\frac{5}{7}, \frac{4}{11}$ _____ **11.** $\frac{2}{15}, \frac{1}{25}$ _____ **12.** $\frac{8}{9}, \frac{5}{12}$ _____

Mystery Fractions

For each pair of fractions, write equivalent fractions with the same denominator. Cross out each new fraction in the fraction strip. The 2 fractions remaining are the mystery fractions. They are also equivalent.

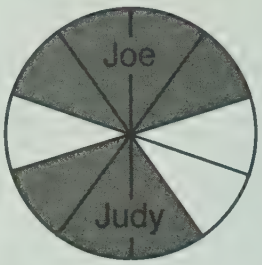
$\frac{24}{30}$	$\frac{35}{90}$	$\frac{4}{30}$	$\frac{15}{30}$	$\frac{15}{60}$	$\frac{18}{90}$	$\frac{9}{30}$	$\frac{8}{60}$	$\frac{20}{30}$	$\frac{12}{90}$

13. $\frac{4}{5}$, $\frac{3}{6}$ **14.** $\frac{3}{10}$, $\frac{2}{3}$ **15.** $\frac{1}{4}$, $\frac{2}{15}$ **16.** $\frac{7}{18}$, $\frac{3}{15}$

63 $\frac{55}{77}, \frac{28}{77}$ 8 $\frac{6}{8}, \frac{1}{8}$

Adding and Subtracting with Like Denominators

A pie is cut into 10 equal slices.



Joe ate $\frac{4}{10}$ of the pie and Judy ate $\frac{3}{10}$ of the pie.

How much of the pie did they eat altogether?

Add.

Judy ↓ $\frac{3}{10}$ + Joe ↓ $\frac{4}{10}$ = $\frac{7}{10}$

They ate $\frac{7}{10}$ of the pie.

How much of the pie was left over?

Subtract.

1 whole pie ↓ $\frac{10}{10}$ − part eaten ↓ $\frac{7}{10}$ = $\frac{3}{10}$

$\frac{3}{10}$ of the pie was left over.

Add.

1. $\frac{1}{5} + \frac{2}{5}$

2. $\frac{3}{8} + \frac{4}{8}$

3. $1\frac{1}{4} + 2\frac{1}{4}$

4. $8\frac{3}{7} + 1\frac{2}{7}$

Subtract.

5. $\frac{7}{20} - \frac{3}{20}$

6. $\frac{13}{15} - \frac{6}{15}$

7. $12\frac{7}{24} - 9\frac{5}{24}$

8. $36\frac{21}{50} - 19\frac{16}{50}$

Complete the squares to make true sentences.

9. $5\frac{\square}{8} + 3\frac{1}{8} = 8\frac{7}{8}$

10. $20\frac{9}{12} - \square\frac{\square}{12} = 12\frac{18}{24}$

11. $6\frac{4}{15} + \frac{3}{\square} = \square\frac{7}{15}$

12. $\square\frac{\square}{25} - 13\frac{\square}{25} = 9\frac{1}{25}$

9 $\frac{3}{5}$ $\frac{4}{20}$

Adding Fractions with Unlike Denominators

Add $\frac{1}{4}$ and $\frac{1}{8}$.

Rewrite $\frac{1}{4}$ as an equivalent fraction with denominator of 8.

Rewrite. $\frac{1}{4} = \frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$

Add. $\frac{2}{8} + \frac{1}{8} = \frac{3}{8}$

We can add fractions if their denominators are the same.

Add $\frac{1}{4}$ and $\frac{1}{3}$.

The least common multiple of 4 and 3 is 12.

Rewrite. $\frac{1}{4} = \frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$

$\frac{1}{3} = \frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$

Add. $\frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

Add. Express each sum in lowest terms.

1. $\frac{2}{3} + \frac{1}{6}$

2. $\frac{5}{12} + \frac{7}{24}$

3. $\frac{3}{8} + \frac{5}{16}$

4. $\frac{5}{27} + \frac{2}{9}$

5. $\frac{1}{3} + \frac{1}{5}$

6. $\frac{3}{8} + \frac{1}{3}$

7. $\frac{5}{6} + \frac{3}{5}$

8. $\frac{3}{20} + \frac{9}{30}$

9. Bill, Tom, and Mrs. Gray helped Mr. Gray paint the fence. Bill painted $\frac{3}{8}$ of the fence, Tom painted $\frac{1}{6}$ of the fence and Mrs. Gray painted $\frac{1}{12}$ of the fence.
What part of the fence did the three of them paint altogether? _____

Here is a code.

$\frac{31}{40}$	$\frac{7}{36}$	$\frac{29}{75}$	$\frac{7}{9}$	$\frac{5}{12}$
T	E	C	A	H

With what animal should you not play cards? Add to answer the riddle.

$\frac{1}{9} + \frac{2}{3}$	$\frac{3}{25} + \frac{4}{15}$	$\frac{1}{4} + \frac{1}{6}$	$\frac{1}{6} + \frac{1}{36}$	$\frac{1}{12} + \frac{1}{9}$	$\frac{3}{8} + \frac{2}{5}$	$\frac{1}{3} + \frac{4}{9}$	$\frac{1}{12} + \frac{1}{3}$

$\frac{8}{15}$ $\frac{5}{8}$ $\frac{5}{6}$

Adding Fractions, Regrouping

Marta baby-sat for $3\frac{1}{2}$ h on Saturday and $2\frac{1}{3}$ h on Sunday. Jane baby-sat for $4\frac{3}{4}$ h on Saturday and $2\frac{1}{2}$ h on Sunday. Find each girl's total time.

Marta

$$3\frac{1}{2} = 3\frac{3}{6}$$
$$2\frac{1}{3} = 2\frac{2}{6}$$
$$5\frac{5}{6}$$

sum of the whole numbers

sum of the fractions

Jane

$$4\frac{3}{4} = 4\frac{3}{4}$$
$$2\frac{1}{2} = 2\frac{2}{4}$$
$$6\frac{5}{4}$$

improper fraction $\frac{5}{4} = 1\frac{1}{4}$

so, $6\frac{5}{4} = 6 + 1\frac{1}{4} = 7\frac{1}{4}$

regroup

Marta's total is $5\frac{5}{6}$ h and Jane's total is $7\frac{1}{4}$ h.

Add. Regroup if necessary.

1. $8\frac{1}{8} + 3\frac{1}{4}$

2. $1\frac{2}{3} + 2\frac{2}{3}$

3. $9\frac{1}{5} + 3\frac{1}{10}$

4. $9\frac{4}{5} + 3\frac{7}{10}$

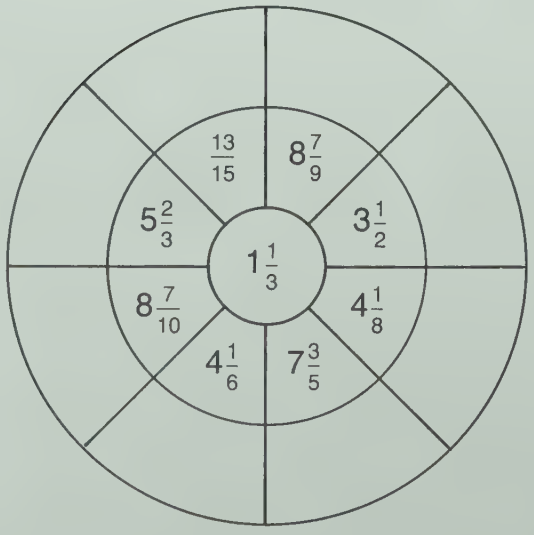
5. $1\frac{5}{6} + 2\frac{5}{9}$

6. $3\frac{1}{7} + 4\frac{6}{7}$

7. $10\frac{5}{12} + \frac{3}{16}$

8. $\frac{7}{10} + \frac{13}{30}$

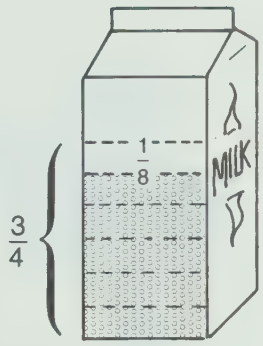
Complete the wheel.
Add each number to the number in the centre.



$11\frac{3}{8}$ $4\frac{7}{18}$

Subtracting Fractions with Unlike Denominators

A container of milk was $\frac{3}{4}$ full. Bob drank $\frac{1}{8}$ of the milk.
How full is the container?



Subtract. $\begin{array}{r} \frac{3}{4} \\ -\ \frac{1}{8} \\ \hline \end{array}$

We could subtract if the denominators were the same.

Rewrite and subtract. $\frac{3}{4} \xrightarrow{\times 2} \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$ ($\times 2$ on both)

The container is $\frac{5}{8}$ full.

Subtract. Reduce each difference to lowest terms.

1. $\begin{array}{r} \frac{7}{8} \\ -\ \frac{5}{8} \\ \hline \end{array}$

2. $\begin{array}{r} \frac{1}{2} \\ -\ \frac{1}{4} \\ \hline \end{array}$

3. $\begin{array}{r} \frac{4}{9} \\ -\ \frac{1}{3} \\ \hline \end{array}$

4. $\begin{array}{r} \frac{7}{20} \\ -\ \frac{1}{10} \\ \hline \end{array}$

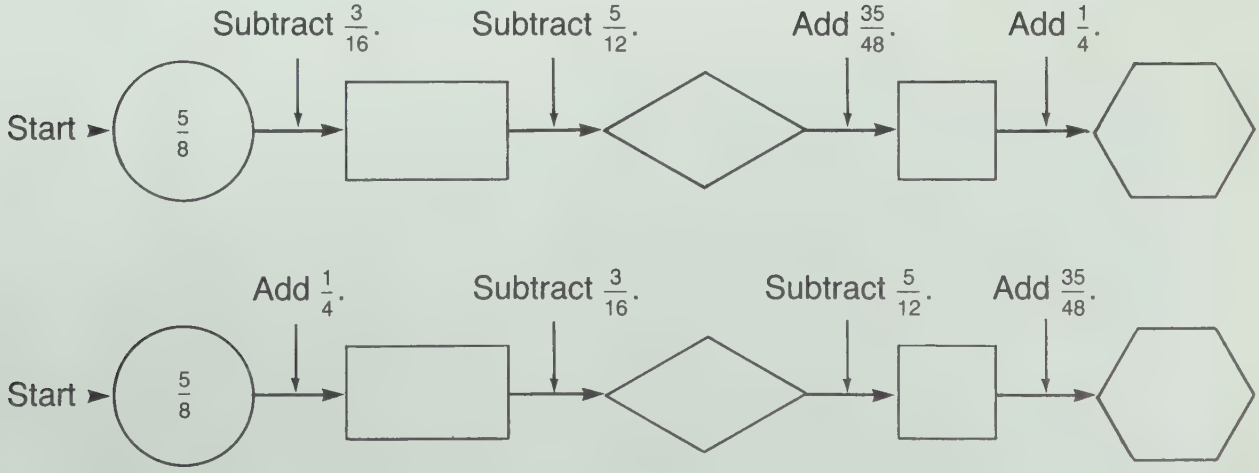
5. $\begin{array}{r} \frac{4}{5} \\ -\ \frac{1}{6} \\ \hline \end{array}$

6. $\begin{array}{r} \frac{3}{8} \\ -\ \frac{3}{12} \\ \hline \end{array}$

7. $\begin{array}{r} \frac{7}{10} \\ -\ \frac{3}{25} \\ \hline \end{array}$

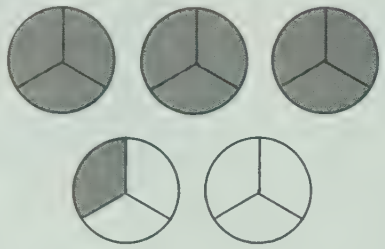
8. $\begin{array}{r} \frac{11}{30} \\ -\ \frac{1}{4} \\ \hline \end{array}$

Follow the two paths. How do the results compare?



Subtracting Fractions, Regrouping

$5 - 3\frac{1}{3}$



Regroup 5 as $4\frac{3}{3}$.

Subtract.

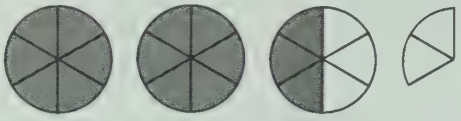
$$\begin{array}{r} 4\frac{3}{3} \\ -\ 3\frac{1}{3} \\ \hline 1\frac{2}{3} \end{array}$$

$3\frac{1}{3} - 2\frac{1}{2}$

Find a common denominator.

$\frac{1}{3} = \frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$; $\quad 3\frac{1}{3} = 3\frac{2}{6}$

$\frac{1}{2} = \frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$; $\quad 2\frac{1}{2} = 2\frac{3}{6}$



Regroup $3\frac{2}{6}$ as $2\frac{8}{6}$.

Subtract.

$$\begin{array}{r} 2\frac{8}{6} \\ -\ 2\frac{3}{6} \\ \hline \frac{5}{6} \end{array}$$

Subtract. Reduce each answer to lowest terms.

1. $6 - 4\frac{1}{2}$

2. $9 - 5\frac{3}{5}$

3. $2\frac{3}{4} - \frac{1}{8}$

4. $4\frac{1}{2} - 3\frac{3}{4}$

5. $8\frac{9}{10} - 4\frac{2}{5}$

6. $7\frac{5}{12} - 5\frac{3}{8}$

7. $5\frac{3}{7} - 4\frac{9}{14}$

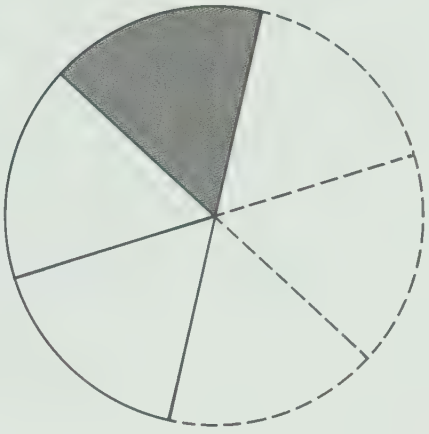
8. $10 - \frac{3}{18}$

9. Carl needs $3\frac{1}{3}$ cups of flour for a bread he is baking. He only has $2\frac{1}{2}$ cups. How much more flour does he need? _____

10. Annette has two different recipes for tomato sauce. One recipe calls for 5 cups of tomatoes. The other recipe calls for $3\frac{2}{3}$ cups of tomatoes. How many more cups of tomatoes are needed for the first recipe than the second? _____

Multiplying Fractions

There is $\frac{1}{2}$ of a pie in Ellen's refrigerator.
Ellen cut the half pie into thirds. She ate $\frac{1}{3}$.
How much of the whole pie did she eat?



To find $\frac{1}{3}$ of $\frac{1}{2}$, multiply.

$$\frac{1}{3} \times \frac{1}{2} = \frac{1 \times 1}{3 \times 2} = \frac{1}{6}$$

Ellen ate $\frac{1}{6}$ of the whole pie.

Multiply. Reduce each product to lowest terms.

1. $\frac{1}{2} \times \frac{3}{4} =$ _____ **2.** $\frac{1}{4} \times \frac{2}{5} =$ _____ **3.** $\frac{3}{10} \times \frac{7}{8} =$ _____ **4.** $\frac{2}{5} \times \frac{1}{5} =$ _____

5. $\frac{1}{9} \times 18 =$ _____ **6.** $10 \times \frac{4}{5} =$ _____ **7.** $\frac{4}{7} \times \frac{4}{7} =$ _____ **8.** $\frac{1}{6} \times \frac{5}{12} =$ _____

9. Claude's math class met for $\frac{3}{4}$ of an hour. $\frac{1}{4}$ of that time was spent reviewing homework. What part of an hour was spent on homework? _____

Tick-Tack-Toe

Multiply. Find the row, column, or diagonal with three of the same products.

$\frac{5}{6} \times \frac{6}{15} =$	$\frac{4}{7} \times \frac{7}{12} =$	$8 \times \frac{1}{16} =$
$\frac{1}{4} \times \frac{6}{8} =$	$\frac{4}{7} \times \frac{7}{8} =$	$\frac{3}{8} \times \frac{4}{8} =$
$\frac{9}{10} \times \frac{5}{9} =$	$\frac{1}{8} \times \frac{1}{8} =$	$\frac{1}{8} \times 5 =$

2 $\frac{3}{16}$ $\frac{3}{8}$

Dividing Fractions

$2 \times \frac{1}{2} = \frac{2}{1} \times \frac{1}{2} = \frac{2}{2} = 1$

$\frac{5}{6} \times \frac{6}{5} = \frac{30}{30} = 1$

$3\frac{1}{4} \times \frac{4}{13} = \frac{13}{4} \times \frac{4}{13} = 1$

Each of these pairs of fractions has a product of 1. We call these pairs **reciprocals.**

We use reciprocals to divide fractions.

Divide 6 by $\frac{1}{2}$.

$6 \div \frac{1}{2} = 6 \times \frac{2}{1} = 12$

$\frac{1}{2}$ and $\frac{2}{1}$ are reciprocals.
Dividing by $\frac{1}{2}$ is the same as multiplying by 2.

Write the reciprocals.

1. $\frac{3}{4}$ _____ **2.** 6 _____ **3.** $3\frac{1}{8}$ _____ **4.** $\frac{1}{5}$ _____ **5.** $\frac{7}{11}$ _____

Divide. Write all quotients in lowest terms.

6. $\frac{1}{2} \div \frac{1}{4} =$ _____ **7.** $\frac{3}{5} \div \frac{1}{5} =$ _____

8. $4 \div \frac{1}{3} =$ _____ **9.** $\frac{3}{10} \div \frac{6}{5} =$ _____

10. $\frac{7}{36} \div \frac{1}{12} =$ _____ **11.** $\frac{4}{9} \div \frac{4}{9} =$ _____

12. $\frac{4}{9} \div \frac{9}{4} =$ _____ **13.** $1 \div \frac{3}{20} =$ _____

14. Mrs. Cook has 3 kg of ground meat. Mrs. Cook uses $\frac{1}{8}$ of a kilogram for each hamburger she makes. How many hamburgers can she make with 3 kg? _____

Write $+$, $-$, $\times$, or $\div$ to make true sentences.

15. $\frac{5}{8}$ _____ $\frac{3}{10} = \frac{3}{16}$ **16.** $\frac{5}{8}$ _____ $\frac{3}{10} = \frac{37}{40}$

17. $\frac{5}{8}$ _____ $\frac{3}{10} = \frac{25}{12}$ **18.** $\frac{5}{8}$ _____ $\frac{3}{10} = \frac{13}{40}$

2 $\frac{4}{3}$ 24 12 $\frac{7}{3}$ $\frac{16}{81}$

Fractions and Their Equivalent Decimals

Compare $\frac{5}{8}$ and $\frac{3}{4}$.

Convert $\frac{5}{8}$ and $\frac{3}{4}$ to equivalent decimals.

$\frac{5}{8} = 5 \div 8 =$

$$\begin{array}{r} 0.625 \\ 8\overline{)5.000} \\ 4\,800 \\ \hline 200 \\ 160 \\ \hline 40 \\ 40 \\ \hline 0 \end{array}$$

$\frac{3}{4} = 3 \div 4 =$

$$\begin{array}{r} 0.75 \\ 4\overline{)3.00} \\ 2\,80 \\ \hline 20 \\ 20 \\ \hline 0 \end{array}$$

Now compare 0.625 and 0.75. We can write $0.75 > 0.625$.

Write $>$, $<$, or $=$ to make true statements.

1. $\frac{1}{2}$ _____ $\frac{1}{3}$ **2.** $\frac{2}{5}$ _____ $\frac{1}{2}$ **3.** $\frac{5}{6}$ _____ $\frac{5}{8}$

4. $\frac{3}{4}$ _____ $\frac{7}{8}$ **5.** $\frac{5}{6}$ _____ $\frac{7}{8}$ **6.** $\frac{3}{8}$ _____ $\frac{1}{4}$

7. $\frac{4}{5}$ _____ $\frac{9}{10}$ **8.** $\frac{9}{10}$ _____ $\frac{7}{8}$ **9.** $\frac{3}{5}$ _____ $\frac{7}{10}$

Unscramble the Letters

Change each fraction to an equivalent decimal. Place the fractions in the strip in order from least to greatest. Then write the matching letter under each fraction to find the scrambled word.

E. $\frac{1}{2}$ _____ **L.** $\frac{5}{6}$ _____ **W.** $\frac{1}{8}$ _____ **N.** $\frac{3}{7}$ _____ **F.** $\frac{3}{4}$ _____

D. $\frac{4}{9}$ _____ **R.** $\frac{7}{10}$ _____ **O.** $\frac{3}{8}$ _____ **U.** $\frac{4}{5}$ _____

least → greatest

< ⚀ > ⚂ > ⚄

Writing Ratios

There are 30 students in Mrs. Burton's class. 20 of them are girls and 10 are boys.

We can write the following ratios (comparisons).

Ratio of girls to boys.	Ratio of girls to total students.	Ratio of boys to total students.
20 to 10	20 to 30	10 to 30
or 20:10	or 20:30	or 10:30
or $\frac{20}{10}$	or $\frac{20}{30}$	or $\frac{10}{30}$

Write each ratio.

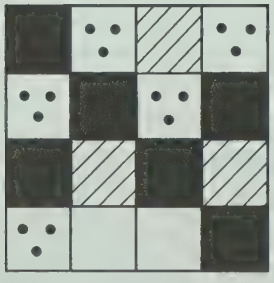
1. black socks to striped socks _____

2. white socks to striped socks _____

3. striped socks to all the socks _____

4. black socks to all the socks _____

5. white socks to all the socks _____



Write each ratio in three different ways.

6. black squares to all the squares _____

7. striped squares to black squares _____

8. white squares to all the squares _____

9. white squares to dotted squares _____

10. dotted squares to black squares _____

6 to 16, 6:16, $\frac{6}{16}$

$\frac{1}{2}$

Finding Equivalent Ratios

There are 12 squares.
4 are shaded black. There are different ratios to describe the picture.

The ratio of black squares to white squares can be written

1:3 or 2:6 or 3:9 or 4:12.

We can find equivalent ratios by multiplying or dividing both numbers in a ratio by the same number.

$\frac{1}{3} \xrightarrow{\times 2} \frac{2}{6}$ $\quad \frac{1}{3} \xrightarrow{\times 2} \frac{2}{6}$

$\frac{4}{12} \xrightarrow{\div 4} \frac{1}{3}$ $\quad \frac{4}{12} \xrightarrow{\div 4} \frac{1}{3}$

Write 3 equivalent ratios for each ratio.

1. $\frac{1}{4}$ _____ **2.** 2:5 _____ **3.** 5:10 _____

Write each ratio in simplest form.

4. $\frac{4}{16}$ _____ **5.** $\frac{10}{25}$ _____ **6.** 7:21 _____

7. For every 7 girls in Cranbury School, there are 5 boys.
Complete the table of equivalent ratios.

Girls	7	14	28			
Boys	5	10				

In each row, three of the ratios are equivalent.
Circle the ratio that doesn't belong.

8.	3:2	9:4	6:4	30:20
9.	9:15	3:5	18:36	15:25
10.	7:14	14:20	28:40	7:10
11.	$\frac{5}{3}$	$\frac{25}{9}$	$\frac{50}{30}$	$\frac{100}{60}$

9:4 $\quad \frac{2}{8}, \frac{3}{12}, \frac{4}{16}$ $\quad \frac{1}{4}$

Finding the Missing Term

In 3 boxes, there are 15 balls.

How many balls are in one box?

Write a ratio.

$$\frac{\text{Number of boxes}}{\text{Number of balls}} = \frac{3}{15}$$

Find an equivalent ratio for 1 box.

$$\frac{3}{15} \xrightarrow{\div 3} \frac{1}{5} = \frac{\text{Number of boxes}}{\text{Number of balls}}$$

There are 5 balls in one box.

Complete each equivalent ratio.

1. $\frac{3}{5} \xrightarrow{\times 2} \frac{\quad}{\quad} \xrightarrow{\times 2}$

2. $\frac{4}{7} \xrightarrow{\times 5} \frac{\quad}{\quad} \xrightarrow{\times 5}$

3. $\frac{24}{18} \xrightarrow{\div 6} \frac{\quad}{\quad} \xrightarrow{\div 6}$

4. $\frac{40}{90} = \frac{\quad}{9}$

5. $\frac{25}{45} = \frac{\quad}{90}$

6. $\frac{2}{3} = \frac{\quad}{12}$

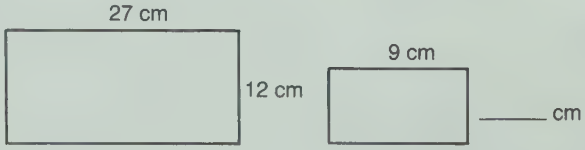
7. $\frac{1}{2} = \frac{\quad}{14}$

8. $\frac{5}{8} = \frac{\quad}{32}$

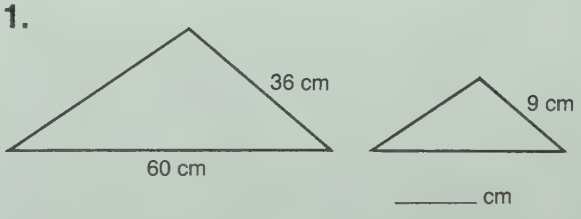
9. $\frac{25}{45} = \frac{\quad}{9}$

Find the missing side for each pair of similar figures.

10.



11.



12. Complete the table of equivalent ratios.

$\frac{2}{3}$	$\frac{\quad}{9}$	$\frac{10}{\quad}$	$\frac{\quad}{18}$	$\frac{16}{\quad}$	$\frac{\quad}{30}$

Finding Unit Rates

Mrs. Simon drove 400 km in 5 h.
What was her rate per hour?

Mrs. Simon drove at a rate of $\frac{400 \text{ km}}{5 \text{ h}}$.

To find her rate for one hour, find the missing term of the ratio.

$$\frac{400}{5} = \frac{?}{1}$$

$$\frac{400}{5} \xrightarrow{400 \div 5} \frac{80}{1}$$

$$\frac{400}{5} \xrightarrow{5 \div 5} \frac{80}{1}$$

Mrs. Simon drove at a rate of 80 km/h. Her unit rate is 80.

Find each unit rate.

1. 540 km in 6 h

_____

2. 45 mL in 9 s

_____

3. 10 kg for 80 L

_____

4. 1800 m in 120 s

_____

5. 8°C in 10 d

_____

6. 4860 L in 10 h

_____

Match each situation with the rate that describes it.

7. how fast you ride your bike — km/L

8. how fast to fill a bucket of water — cm/km

9. how to use a scale on a map — km/h

10. how far a car travels on a tank of gas — L/min

Who walked at the fastest rate?
Here is a list of distances walked by four boys and the times for each. Find each unit rate to tell which boy walked the fastest.

Name	Distance walked	Time	Unit rate
Ravinder	18 km	240 min	
Paul	10 000 m	2 h	
Steve	24 km	4 h	
Victor	0.52 km	6 min	

km/h 90 km/h 15 m/s

Writing Percents

One hundred students voted in a school election.
This chart shows the results.

Candidate	Number of votes	Ratio	Fraction	Decimal	Percent
Steve	43 out of 100	43:100	$\frac{43}{100}$	0.43	43%
Lisa	35 out of 100		$\frac{35}{100}$		
Anna	13 out of 100	13:100			
René	9 out of 100			0.09	

Percent means out of 100. 43% can be written as $\frac{43}{100}$, 43:100, or 0.43.

Using Steve's results as an example, complete the table.

Write each as a percent.

1. 75 out of 100 _____ **2.** 10 out of 100 _____ **3.** 1 out of 100 _____

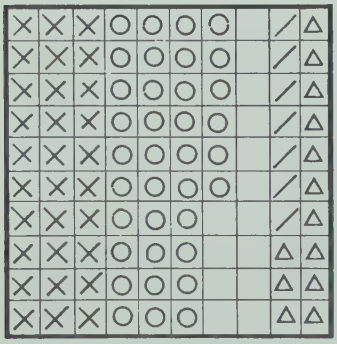
4. $\frac{35}{100}$ _____ **5.** $\frac{87}{100}$ _____ **6.** $\frac{3}{100}$ _____

7. 0.45 _____ **8.** 0.09 _____ **9.** 0.20 _____

Write each percent as a ratio.

10. 82% _____ **11.** 20% _____ **12.** 7% _____

There are 100 boxes in the picture. Complete the table.



	Number	Ratio	Fraction	Decimal	Percent
X's		:100			
O's		:100			
/'s		:100			
△'s		:100			
blanks		:100			

35% 45% 75% 82:100

Fractions and Decimals as Percents

There were 5 questions on Joe's test.
He got 4 of the questions correct.
What percent did he get correct?

Joe got $\frac{4}{5}$ of the questions correct.

Write $\frac{4}{5}$ as a decimal.

$$5\overline{)4.00} = 0.80$$

$$4\,00$$

$$0$$

$0.08 = \frac{80}{100} = 80\%$

Joe got 80% of the questions correct.

Write each decimal as a percent.

1. 0.65 _____ **2.** 0.12 _____ **3.** 0.09 _____ **4.** 0.90 _____

Write each fraction as a percent.

5. $\frac{53}{100}$ _____ **6.** $\frac{4}{100}$ _____ **7.** $\frac{3}{10}$ _____

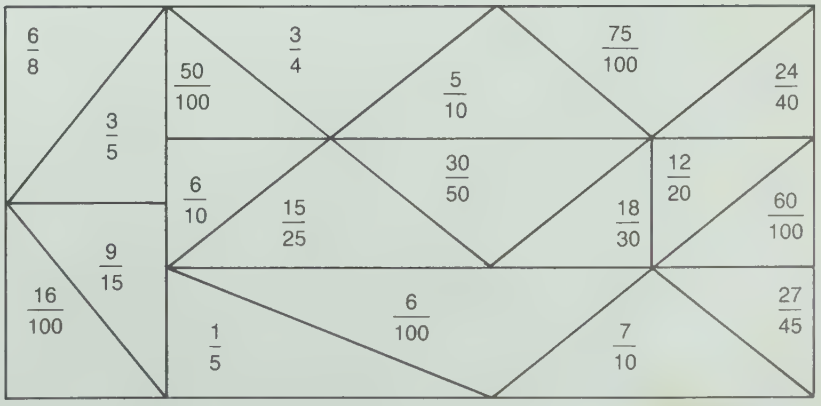
8. $\frac{6}{20}$ _____ **9.** $\frac{7}{25}$ _____ **10.** $\frac{9}{50}$ _____

11. $\frac{4}{50}$ _____ **12.** $\frac{1}{25}$ _____ **13.** $\frac{1}{4}$ _____

Write each as a percent. Round each quotient to two digits.

14. $\frac{3}{8}$ _____ **15.** $\frac{7}{12}$ _____ **16.** $\frac{4}{9}$ _____

Write each fraction as a percent.
Shade all triangles that contain fractions equivalent to 60%.



65% 38% 30% 8% 53%

Percents as Decimals and Fractions

48% of the children attending Nicolet School arrive by school bus. What fraction of the children come by bus?

$48\% = 0.48 = \frac{48}{100} = \frac{12}{25}$

Rewrite 48% as a decimal and a fraction.

Reduce to an equivalent fraction in lowest terms.

$\frac{12}{25}$ of the children come by bus.

Write each percent as a decimal.

1. 17% _____ **2.** 58% _____ **3.** 40% _____

4. 6% _____ **5.** 20% _____ **6.** 95% _____

Write each percent as a fraction in lowest terms.

7. 32% _____ **8.** 60% _____ **9.** 10% _____

10. 5% _____ **11.** 47% _____ **12.** 20% _____

13. 100% _____ **14.** 99% _____ **15.** 50% _____

Double Match

Match each percent to a decimal and to a fraction in lowest terms.

0.75	50%	$\frac{1}{5}$
0.20	75%	$\frac{9}{20}$
0.50	20%	$\frac{3}{4}$
0.45	45%	$\frac{1}{2}$

0.06 $\frac{1}{20}$ $\frac{8}{25}$ 0.17 1

Finding a Percent of a Number

A group of 200 people were asked to name their favorite color.
32% chose red. How many people chose red?

Find 32% of 200

or 0.32 of 200.

$$\begin{array}{r} 200 \\ \times\ 0.32 \\ \hline 400 \\ 600 \\ \hline 64.00 \end{array}$$

To find a percent of a number, change the percent to a decimal and multiply.

Remember to place the decimal correctly.

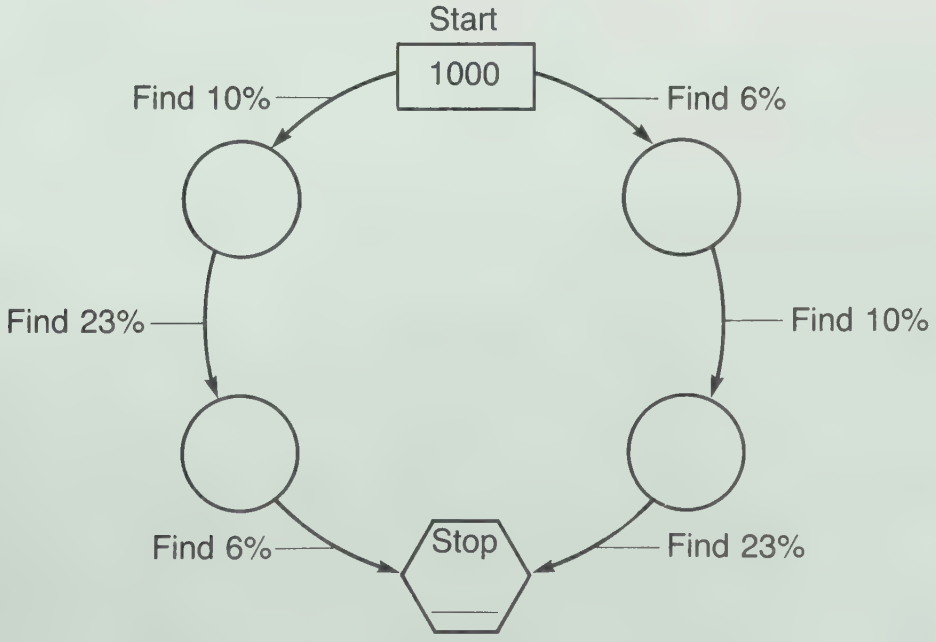
64 out of the 200 people chose red.

Find each of these.

1. 20% of 150 _____ **2.** 35% of 300 _____ **3.** 8% of 400 _____

4. 8% of 40 _____ **5.** 85% of 50 _____ **6.** 13% of 1400 _____

Start with 1000 and follow the paths in both directions.
The result in the stop sign will be the same.



Changing Values in Ratios

Find the missing terms in these ratios.

$\frac{0.5}{0.8} = \frac{5}{\blacksquare}$

$0.5 \times 10 = 5$
$8 \times 10 = 8$

8 is the missing term.

$\frac{0.5}{0.8} = \frac{\blacksquare}{80}$

$0.8 \times 100 = 80$
$0.5 \times 100 = 50$

50 is the missing term.

Remember:

To multiply by

10—move the decimal point 1 place to the right.

100—move the decimal point 2 places to the right.

1000—move the decimal point 3 places to the right.

Changing the place value in a ratio by multiplying both the numerator and denominator by 10, 100, or 1000 will result in an equivalent ratio.

Finding the missing term in each ratio.

1. $\frac{1.9}{2.4} \overset{\times 10}{=} \frac{19}{\times 10}$

2. $\frac{0.36}{0.47} \overset{\times 100}{=} \frac{\quad}{4.7}$ $\times 100$

3. $\frac{0.10}{0.53} \overset{\times 100}{=} \frac{10}{\times 100}$

4. $\frac{7.5}{0.81} = \frac{75}{\quad}$

5. $\frac{7}{1.1} = \frac{\quad}{11}$

6. $\frac{0.85}{684} = \frac{8.5}{\quad}$

7. $\frac{0.005}{0.373} = \frac{\quad}{37.3}$

8. $\frac{86}{113} = \frac{8600}{\quad}$

9. $\frac{6.487}{107.8} = \frac{\quad}{1078}$

In each row there are 3 equivalent ratios. Circle the ratio that does not belong with the other 3.

10. $\frac{8.75}{10}$ $\frac{87.5}{100}$ $\frac{875}{100}$ $\frac{875}{1000}$

11. $\frac{0.47}{6.4}$ $\frac{4.7}{64}$ $\frac{47}{640}$ $\frac{47}{64}$

12. $\frac{3}{0.75}$ $\frac{3}{7.5}$ $\frac{30}{75}$ $\frac{300}{750}$

13. $\frac{0.008}{0.573}$ $\frac{0.08}{5.73}$ $\frac{0.8}{57.3}$ $\frac{0.8}{5.73}$

14. $\frac{5.752}{13.6}$ $\frac{57.52}{13.6}$ $\frac{57.52}{136}$ $\frac{575.2}{1360}$

0.5 24 $\frac{875}{100}$ 8.1

Dividing with Tenths

Divide 92.4 by 1.5.

$1.5\overline{)92.4}$ → Multiply 1.5 by 10 and 92.4 by 10 to make the divisor a whole number.

$$\begin{array}{r} 61.6 \\ 15\overline{)924.0} \\ 90 \\ \hline 24 \\ 15 \\ \hline 90 \\ 90 \\ \hline 0 \end{array}$$

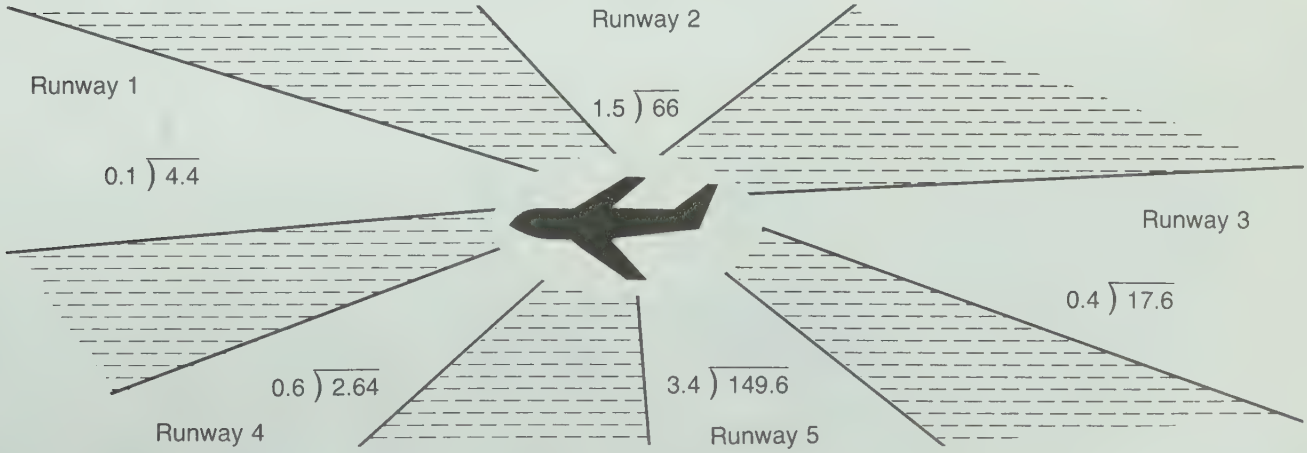
Add a 0 to get another place.

Divide. Then check by multiplying.

1. $0.4\overline{)1.84}$ **2.** $0.9\overline{)4.14}$ **3.** $0.5\overline{)32.5}$

4. $0.1\overline{)4.97}$ **5.** $4.8\overline{)120}$ **6.** $2.5\overline{)1.35}$

Which runway should the plane land on?
Divide. Land the plane on the runway whose quotient is different from the others.



4.97 4.6

Rounding Quotients

Divide 7.341 by 0.4. Round the quotient to the nearest tenth, hundredth, and thousandth.

Nearest tenth:

$$0.4\overline{)7.341} \rightarrow 18.4$$

18.35
4
33
32
14
12
21
20
1

When rounding to the nearest tenth, divide to the hundredths.

Nearest hundredth:

$$0.4\overline{)7.3410} \rightarrow 18.35$$

18.352
4
33
32
14
12
21
20
10
8
2

When rounding to the nearest hundredth, divide to the thousandths.

Nearest thousandth:

$$0.4\overline{)7.34100} \rightarrow 18.353$$

18.3525
4
33
32
14
12
21
20
10
8
20
20
0

When rounding to the nearest thousandth, divide to the ten thousandths.

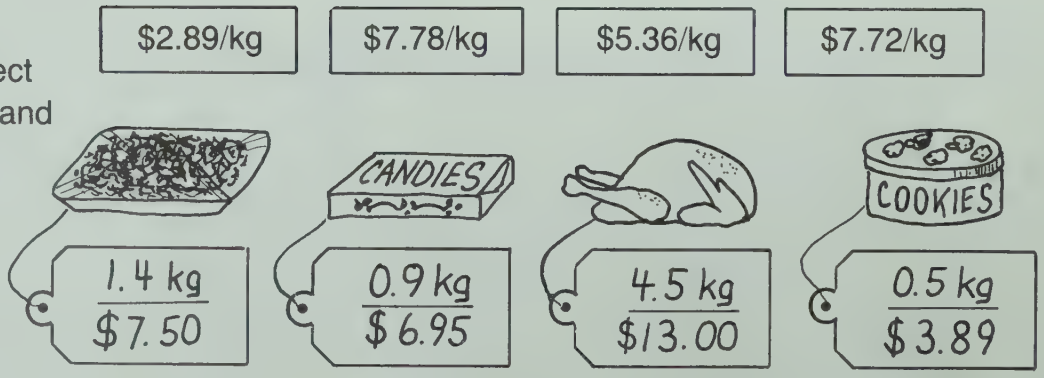
Divide. Round each quotient to the nearest tenth.

1. $0.3\overline{)5.68}$

2. $0.5\overline{)2.46}$

3. $0.4\overline{)21.53}$

Match the unit price labels with the correct product by dividing and rounding to the nearest hundredth.

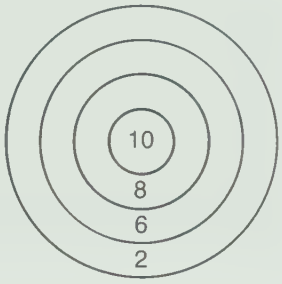


Estimating and Testing

One way to solve a problem is to make an estimate of what you think the answer might be and then to test the estimate. If you were wrong the first time, you usually can tell whether your estimate was too large or too small. Then you can make a second, better estimate.

1. Bob and Alex were playing darts. They each threw 4 darts and scored 32 points each. None of Bob's darts landed in the same area as any of Alex's. Where might their darts have landed?

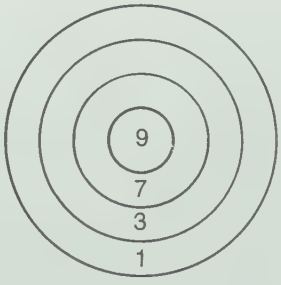
Bob and Alex



2. The next time they played, they each scored 32 points again. This time one of Bob's darts landed in the same area as some (one or more) of Alex's. Where might their darts have landed this time?

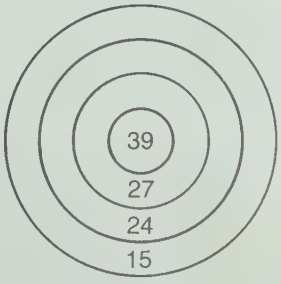
3. Jenny and Amy both scored 28 points with 4 darts. None of Jenny's darts landed in the same area as any of Amy's. Where might their darts have landed?

Jenny and Amy



4. Marty scored 96 points with 4 darts. Where might they have landed?

Marty



Too Much Information

In each problem underline the information needed and draw a line through the information not needed.

1. The Québec Coliseum can seat 10 484. The Winnipeg Arena can seat 10 151 and the Montréal Forum 16 074. How many more people can the Forum seat than the Coliseum?

2. Florence has $39.73 in her savings account. She received $15.00 for her birthday and earned $6.00 helping her neighbor plant shrubs. She deposited $9.50 in her account. How much money does she have in her savings now?

3. Mrs. Chu drove 235 km last week. She bought 40 L of gas at $0.44/L and gave the attendant $20. How much did the gasoline cost?

4. Mr. and Mrs. Freeman took their two children to the fair. Tickets cost $3.50 for an adult and $1.75 for a child. At the fair they each had a hot dog and a soda. Hot dogs cost 95¢ each and sodas cost 65¢. How much were the tickets?

5. The Fix-It Plumbing Service charges $18.50 an hour for labor on weekdays and $25.00 an hour on weekends and after 5:00 p.m. The plumber arrived at the Stones' house on Friday morning at 10:00 a.m. He finished at 1:00 p.m. How much was the bill for labor?

6. Frank charges $1.75 an hour for baby-sitting. He also mows lawns, rakes leaves, and so on. He charges $2.50 for those services. The other day he baby-sat for 6 h. How much did he earn baby-sitting?

7. At the record store there are 4 different prices for records. The **A** records cost $3.98, the **B** records cost $4.50, the **C** cost $5.95, and the **D** cost $7.00. Mark bought two **B** records and a **C** record. How much did he spend?

8. Nancy wants to buy a new computer game. She cannot make up her mind whether to buy *Alien* for $9.95 or *Hit It* for $12.25. She has $15. How much more does *Hit It* cost than *Alien*?

9. On last week's spelling test, Mal got 19 right out of a possible 20. Gert got 17 right. If each right answer is worth 5 points, what was Gert's score?

Finding Information

Tell what you might do to find this information.

1. the northernmost settlement in Canada

2. the city in the world with the greatest population

3. the population of the city in the world with the greatest population

4. the number of students in your school

5. the number of students in grades 1 to 7 in your town or city

6. the average January temperature in your region

7. the name of the person who was Prime Minister in 1955

8. the shortest road distance between Ottawa and Toronto

9. the number of Representatives in the U.S. Congress

10. the average height of the students in your class

Find two items of information from those above. Report to your class.

Skills Practice

These problems use skills that you have learned in previous grades, as well as ones that are new this year.

1. Joanne drove ■ km/h for ▲ h. How far did she go? Circle the operation you would use to solve this problem.

$+$ $-$ $\times$ $\div$

2. Dieter, Tim, and Ellen are going to share evenly a box of 26 old records they bought at a garage sale. How many records will each receive?

_____

3. After the movie Betsy and Margaret stopped to buy ice-cream cones. Cones are 85¢ for small, and $1.00 for large. How much did they spend?

_____

4. The sum of two numbers is 40. Their product is 396. What are the numbers?

_____

5. You have four coins in your pocket—quarters, dimes, nickels, pennies. How much money do you have? Make a table.

6. Agnes, Bob, and Carl are running for class office. There are three positions—president, secretary, and treasurer. How many ways could the three students win the three offices? Make a list.

_____

Using Decimals

1. Joshua stopped at the produce counter. He bought 5 kg of potatoes, 0.6 kg of tomatoes, and 1.4 kg of apples. How many kilograms of fruit and vegetables did he buy?

_____

2. Helen's dog has three puppies. Their masses are 4.4 kg, 3.75 kg, and 4.16 kg. What is their total mass?

_____

3. Betty and her friends went on a four-day hike. They hiked 6.75 km the first day, and 9.25 km, 6.8 km, and 10.35 km on the next three days. How far did they hike in all?

_____

4. One day the girls passed a sign that said "Altitude: 823.5 m." Further along the road was another sign that said "Altitude: 1033 m." How far up had they climbed between signs?

_____

5. At the beginning of a trip, Mrs. Harrigan made a note of her odometer reading. It was 24 242.5. When she returned from the trip it was 26 333.2. How many kilometres did she drive on the trip?

_____

6. Mrs. Harrigan also kept a log of the gas she bought. She bought gas five times, in these amounts: 41.3 L, 35.9 L, 37.6 L, 43.8 L, and 49.9 L. How many litres did she buy in all?

_____

Finding the Number of Possibilities

Draw a tree diagram to show the different ways that each set of cards can be arranged in your hand. Then give the number of possible arrangements.

1.

2.

3.

Use exercises 1 to 3 to complete these statements.

4. Number of choices for first card ☐ × Number of choices for second card ☐ = Number of possible arrangements ☐

5. Number of choices for first card ☐ × Number of choices for second card ☐ × Number of choices for third card ☐ = Number of possible arrangements ☐

6. Number of choices for first card ☐ × Number of choices for second card ☐ × Number of choices for third card ☐ × Number of choices for fourth card ☐ = Number of possible arrangements ☐

7. How many different ways can you arrange 5 cards in your hand?

_____

8. How many different ways can you arrange 8 cards in your hand?

_____

Solving Problems in Two or More Steps

Solve each problem. Show your work.

1. At the gas station Curt bought 34 L of gas at $0.41/L and 1 L of oil for $1.98. How much did he spend?

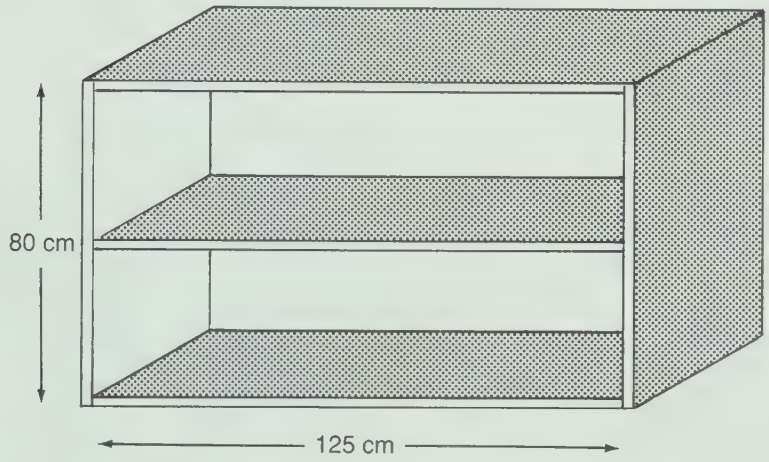
_____

2. Diane bought a record for $4.72 and a tape for $6.13. She gave the clerk $15.00. How much change did she receive?

_____

3. Zelda is building a bookcase like the one shown. The back is open. If boards are $3.20/m, how much will the lumber cost?

_____



4. Complete the cheque register. Hint: first subtract the amount of cheque number 23 from the balance.

Cheque number	Date	Transaction	Debit (−)	Credit (+)	Balance $423.00
23	84 07 05	Green's Grocer	27.35		
24	84 07 13	Telephone	32.16		
	84 07 15	Paycheque		214.92	
25	84 07 15	Al's Hardware	12.90		

Reasonable Measurements

Circle the most reasonable measurement.

1. What is the mass of the puppy?

36 kg 3.6 kg 0.36 kg

2. How far is it to the public library?

8 km 8 m 8 L

3. How much juice does the pitcher hold?

1.3 L 1.3 g 1.3 mL

4. What is the area of the rug?

15 cm^2 150 m^2 15 m^2

5. How long is the truck?

0.5 km 25 kg 15 m

6. How long did it take Charles to walk to school?

25 s 25 min 25 h

7. What is the volume of Pat's lunch box?

7500 cm^3 7500 cm 7500 cm^2

8. What is the perimeter of your math book?

93 cm^2 93 mm 93 cm

Writing and Solving Equations

Solve each equation. Write a related equation if necessary.

1. $15 - n = 8$

_____

_____

2. $27 - 19 = n$

_____

_____

3. $4 \times n = 36$

_____

_____

4. $n \times 11 = 99$

_____

_____

5. $52 \div n = 4$

_____

_____

6. $n \times 7 = 154$

_____

_____

Write and solve an equation for each problem.

7. Mrs. Lamont bought 4 packages of hot dogs. She paid $5.00 for them. How much did each package cost?

_____

_____

8. She also bought a jar of mustard for 69¢ and a jar of relish for 89¢. How much did the mustard and relish cost together?

_____

_____

9. There will be 23 people at the cook-out. Assume that each will drink 0.5 L of lemonade. How much lemonade should be made?

_____

_____

10. Of the 23 guests, there will be 14 adults. How many children will be there?

_____

_____

Logical Thinking

This map of Canada has 11 cities marked with dots. An airline has routes connecting some of the cities as shown.

An airline has an agent in each of the 11 cities. We will call them Anna, Burt, Carl, Donna, Elaine, Fred, Gil, Harriet, Ian, Jane, and Ken. Since the agents in cities with connecting flights need to talk to each other now and then, it is a good idea for them to be friends. It was learned that the following pairs are friends.

Anna–Burt	Harriet–Fred	Ian–Ken	Jane–Ian
Gil–Jane	Gil–Ian	Donna–Elaine	Anna–Gil
Ken–Elaine	Donna–Ken	Donna–Ian	Jane–Carl
Carl–Harriet	Gil–Ken		

Can you place the 11 people in the 11 cities so that the cities with connecting flights are staffed by people who are friends?

Using Fractions

The type in newspapers and books generally has proportional spacing. That means that different letters take up different amounts of horizontal space. At one newspaper these are the counts for headlines.

Horizontal Space Count

Symbol	Count	Symbol	Count	Symbol	Count
A	2	a	1	0	1
B	2	b	1	1	$\frac{1}{2}$
C	2	c	1	2	1
D	2	d	1	3	1
E	2	e	1	4	1
F	2	f	1	5	1
G	2	g	1	6	1
H	2	h	1	7	1
I	$\frac{1}{2}$	i	$\frac{1}{2}$	8	1
J	2	j	1	9	1
K	2	k	1	Punctuation	$\frac{1}{2}$
L	2	l	$\frac{1}{2}$	spaces	2
M	$2\frac{1}{2}$	m	$1\frac{1}{2}$		
N	2	n	1		
O	2	o	1		
P	2	p	1		
Q	2	q	1		
R	2	r	1		
S	2	s	1		
T	2	t	1		
U	2	u	1		
V	2	v	1		
W	$2\frac{1}{2}$	w	$1\frac{1}{2}$		
X	2	x	1		
Y	2	y	1		
Z	2	z	1		

Find the horizontal count for each headline.

1. MATHEMATICS IS FUN _____
2. Mathematics Is Important _____
3. Premier Visits New School _____
4. 31 People Injured _____
5. Temperature Climbs to Over 35 _____
6. your name in capital letters _____

Considering the Chances

The chance, or probability, of an event happening is a ratio:

$$\frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}.$$

For example, the probability of spinning a 1 on this spinner is $\frac{1}{3}$.

The probability of spinning a 1 on this spinner is $\frac{1}{2}$.

$\frac{2}{4} = \frac{1}{2}$

Think about spinning a 1. Answer the questions.

1.

How many favorable outcomes? _____

How many possible outcomes? _____

What is the probability of spinning a 1? _____

2.

How many favorable outcomes? _____

How many possible outcomes? _____

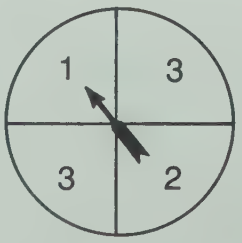
What is the probability of spinning a 1? _____

For each spinner, give the probability.

3. spinning a 1.

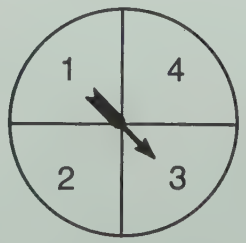
_____

4. spinning a 3.



_____

5. spinning a 1, 2, 3, or 4.



_____

Solving Problems in More Than One Step

The Record Shack is having a sale. If you buy $10.00 worth of records, but less than $20.00, you receive a 10% discount. From $20.00 to $29.99 worth, you receive 15% off. If your purchase is worth $30.00 or more, you receive 20% off. Find the total amount of each purchase. There is a sales tax of 5%.

1. 1 record for $6.89; 3 tapes at $5.75 each.

_____

2. 1 tape for $5.75; 3 records at $4.59 each;
2 records at $6.89 each.

_____

3. 2 records at $4.59 each; 1 tape for $8.90;
3 records at $7.96 each.

_____

4. 3 tapes at $8.90 each; 3 records at $6.89 each;
2 records at $4.59 each.

_____

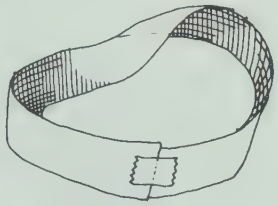
5. 1 tape for $5.75; 5 records at $4.59 each;
1 record for $7.96.

_____

Work With Models

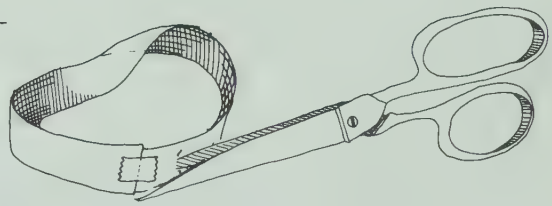
Cut a strip of paper about 40 cm long.

Make a half twist in it and tape or glue the ends together.
You now have a Moebius strip.



With a pencil, draw a line along the strip.
Continue until you return to the place you started.
What happened?

Cut around the strip at the middle.
What happened?



What do you think will happen if you make another strip and cut around it, staying near one edge?

Try it. What happened?

Find some information about the person for whom the strip is named.

Solving Problems Without Pencil and Paper

Here are some ways to calculate in your head.

To subtract 19, subtract 20 and add 1.

$$\begin{aligned} 93 - 19 &= (93 - 20) + 1 \\ &= 73 + 1 \\ &= 74 \end{aligned}$$

Try to do each of these in your head.

1. $\begin{array}{r} 76 \\ -\,19 \\ \hline \end{array}$ **2.** $\begin{array}{r} 85 \\ -\,19 \\ \hline \end{array}$ **3.** $\begin{array}{r} 37 \\ -\,19 \\ \hline \end{array}$ **4.** $\begin{array}{r} 26 \\ -\,19 \\ \hline \end{array}$ **5.** $\begin{array}{r} 103 \\ -\,\,19 \\ \hline \end{array}$

You can use a similar short cut to add 19.

$$\begin{aligned} 35 + 19 &= (35 + 20) - 1 \\ &= 55 - 1 \\ &= 54 \end{aligned}$$

6. $\begin{array}{r} 17 \\ +\,19 \\ \hline \end{array}$ **7.** $\begin{array}{r} 43 \\ +\,19 \\ \hline \end{array}$ **8.** $\begin{array}{r} 65 \\ +\,19 \\ \hline \end{array}$ **9.** $\begin{array}{r} 91 \\ +\,19 \\ \hline \end{array}$ **10.** $\begin{array}{r} 132 \\ +\,\,19 \\ \hline \end{array}$

Find a short cut for each. Explain what you did.

11. $\begin{array}{r} 14 \\ +\,39 \\ \hline \end{array}$ **12.** $\begin{array}{r} 75 \\ -\,29 \\ \hline \end{array}$ **13.** $\begin{array}{r} 62 \\ +\,29 \\ \hline \end{array}$ **14.** $\begin{array}{r} 103 \\ +\,\,49 \\ \hline \end{array}$

Here is a way to do some subtractions without regrouping.

$$\begin{aligned} 200 - 89 &= (200 - 1) - (89 - 1) \\ &= 199 - 88 \\ &= 111 \end{aligned}$$

Change each subtraction so that you can complete it without grouping.

499 + 2

15. $\begin{array}{r} 400 \\ -\,178 \\ \hline \end{array}$ **16.** $\begin{array}{r} 3000 \\ -\,\,957 \\ \hline \end{array}$ **17.** $\begin{array}{r} 501 \\ -\,258 \\ \hline \end{array}$

Skills Review

1. Take a survey in your class. Find out the favorite food, record, rock group, or sport, and make a bar graph.

2. Make a list of at least five things that would affect your choice of what kind of drinks to offer in the school cafeteria.

_____

_____

_____

_____

_____

3. Robert took the bus to visit his cousin. The bus made 6 stops before Robert got off. It left at 9:08 and made the first stop at 10:05. How long did the whole trip take?

_____

4. Katrina bought 2 records for $3.97 each, 1 record for $6.88, and a tape for $5.75. There is an 8% sales tax. How much change should Katrina get from $20.00?

_____

5. At the fruit stand Mr. Cross bought 3 kg of apples for $2.25/kg, 500 g of grapes for $3.15/kg, and 2.5 kg of peaches at $2.85/kg. How much was his total bill?

_____

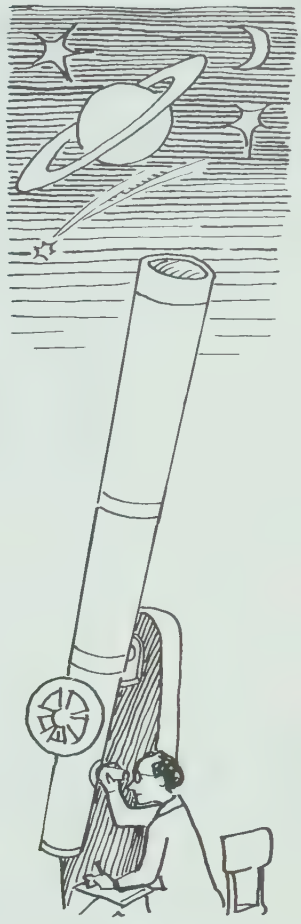
6. The Pizza Palace offers 3 sizes of pizza and 4 different toppings. You can order any one topping or any combination of toppings. How many different pizzas can be ordered?

_____

7. How many ways can you make change for a dollar with no pennies?

_____

Scientific Notation



Scientific notation is a short way to write very large numbers.

An astronomer needs a short way to write that the distance from the earth to the sun is 150 000 000 km. He shortens the number this way.

$$150\,000\,000 = 15 \times 10\,000\,000$$
$$\text{or} \quad 1.5 \times 100\,000\,000$$
$$\text{or} \quad 1.5 \times 10^8$$

In scientific notation, one number must be less than 10 (1.5), and the other number must be a power of 10 (10^8).

Written in scientific notation, the distance from the earth to the sun is 1.5×10^8 km.

Here are some other examples.

$$3\,200 = 3.2 \times 1000 = 3.2 \times 10^3$$
$$480\,000 = 4.8 \times 100\,000 = 4.8 \times 10^5$$
$$1000 = 1 \times 1000 = 1 \times 10^3 = 10^3$$

Write each number in scientific notation.

1. 1 000 000 _____

2. 20 000 _____

3. 86 000 _____

4. 570 000 _____

5. 45 000 000 _____

6. 320 000 000 _____

7. 70 000 000 000 _____

8. 240 000 000 000 _____

Write the standard number for each.

9. The earth has existed for 3.3×10^9 a (years). _____

10. Light travels at 3×10^{10} cm/s (centimetres per second). _____

11. The nearest star to earth besides the sun is 4×10^{13} km away. _____

12. Dinosaurs roamed the earth more than 10^8 a ago. _____

They disappeared about 7×10^7 a ago. _____

Addition Puzzle

Write the correct digit in each shape to complete the addition problems.

1.

	2	◇	2
+	4	9	△
	◇	△	8

2.

	4	○	◇
+	◇	○	◇
	8	2	○

3.

	2	1	△
+	1	○	2
	○	△	6

4.

	1	5	□
+	◇	7	□
	6	□	◇

5.

	6	□	○
+	□	4	5
	9	○	□

6.

	◇	△	2
+	◇	6	3
	3	◇	△

7.

	□	◇	△
+	□	◇	△
	△	2	6

8.

	4	○	5
+	○	9	△
	△	○	1

9.

	7	□	△
+	□	○	□
	9	7	○

10.

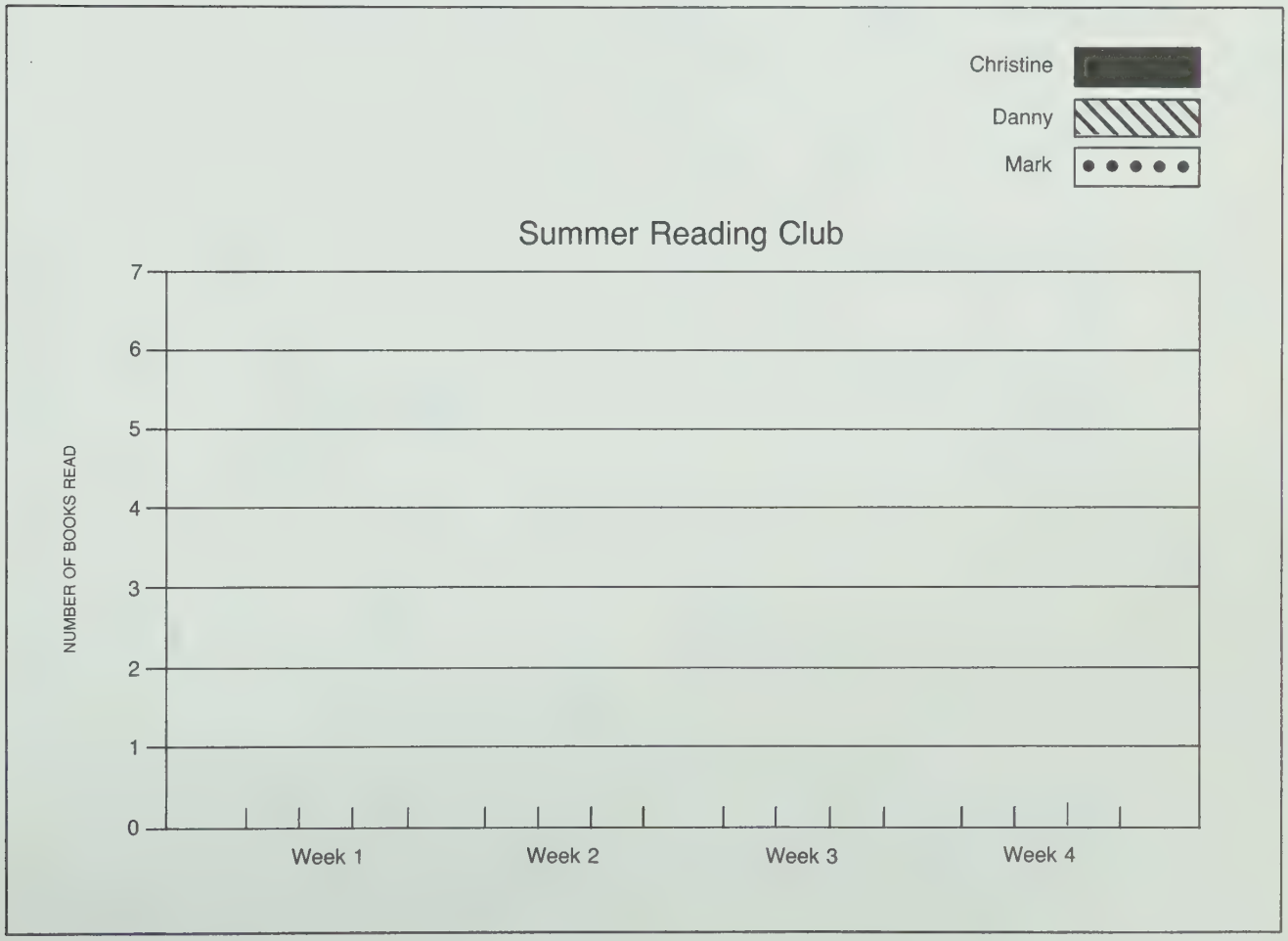
	3	8	9
+	△	△	△
	5	□	□

Multiple Bar Graphs

Christine, Danny, and Mark were members of the summer reading club at their library. The chart shows the number of books that each of them read during the first four weeks of summer.

Construct a triple bar graph below to record the information.

	Number of Books Read			
	Week 1	Week 2	Week 3	Week 4
Christine	2	4	4	1
Danny	3	1	2	5
Mark	6	1	3	2

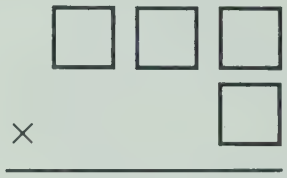


Number Games

Arrange the given digits to give the greatest possible product or quotient.

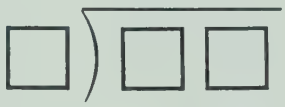
1. 5, 6, 7, 8

2. 0, 2, 3, 4



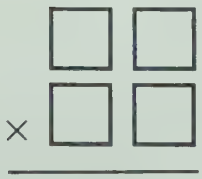
3. 1, 2, 8, 9

4. 4, 6, 9

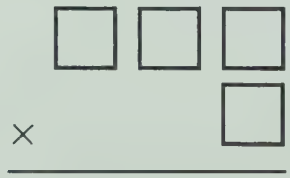


Arrange the given digits to give the smallest possible product or quotient.

5. 1, 2, 3, 4

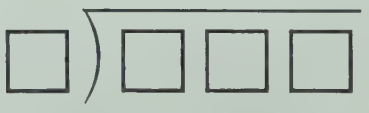


6. 1, 7, 9, 2

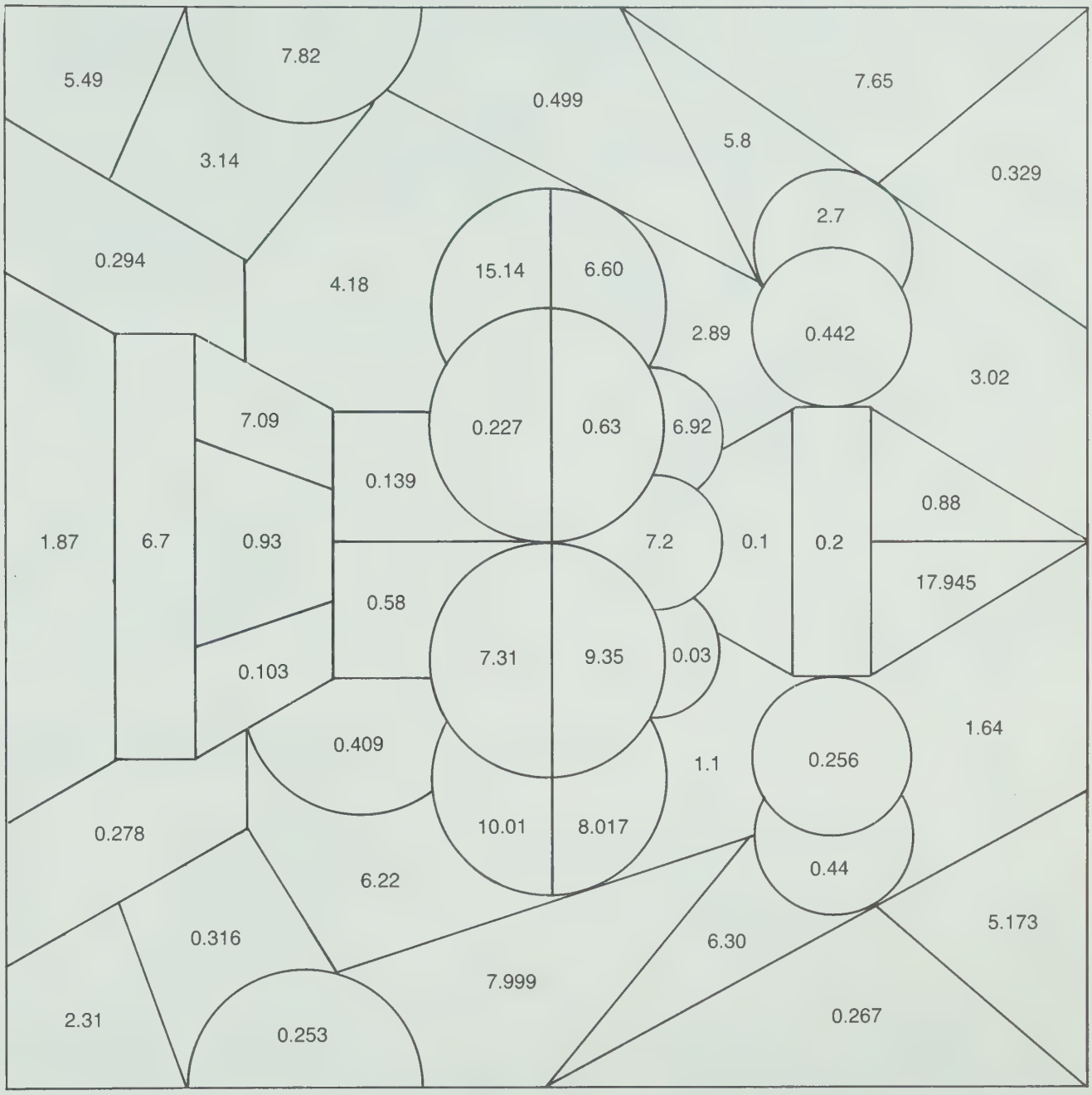


7. 1, 2, 6

8. 4, 6, 9, 8



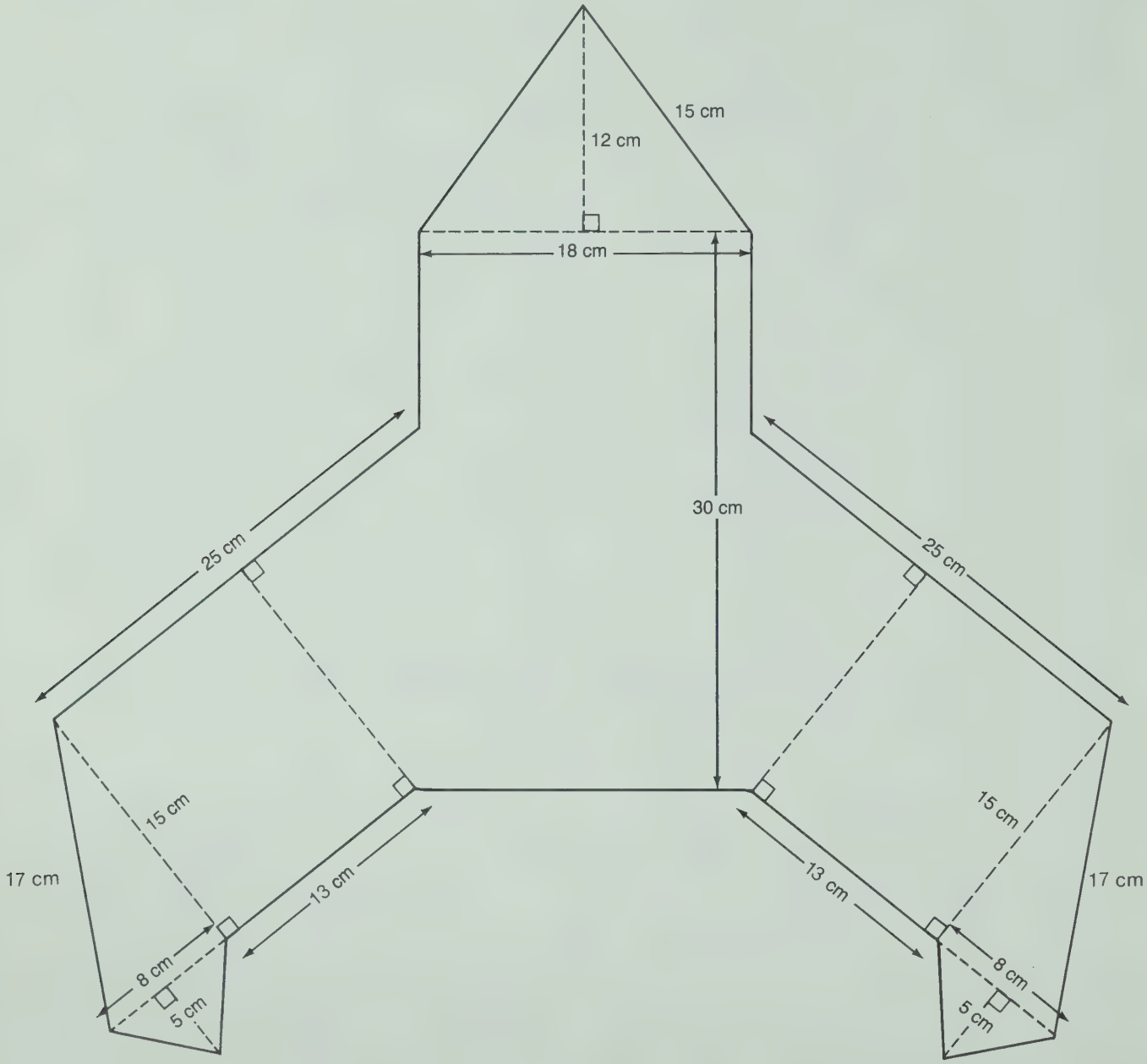
Lost in Space



1. Shade all the decimals between 6.49 and 7.5.
2. Shade all the decimals less than 0.25.
3. Shade all the decimals between 0.5 and 1.
4. Shade all the decimals greater than 8.

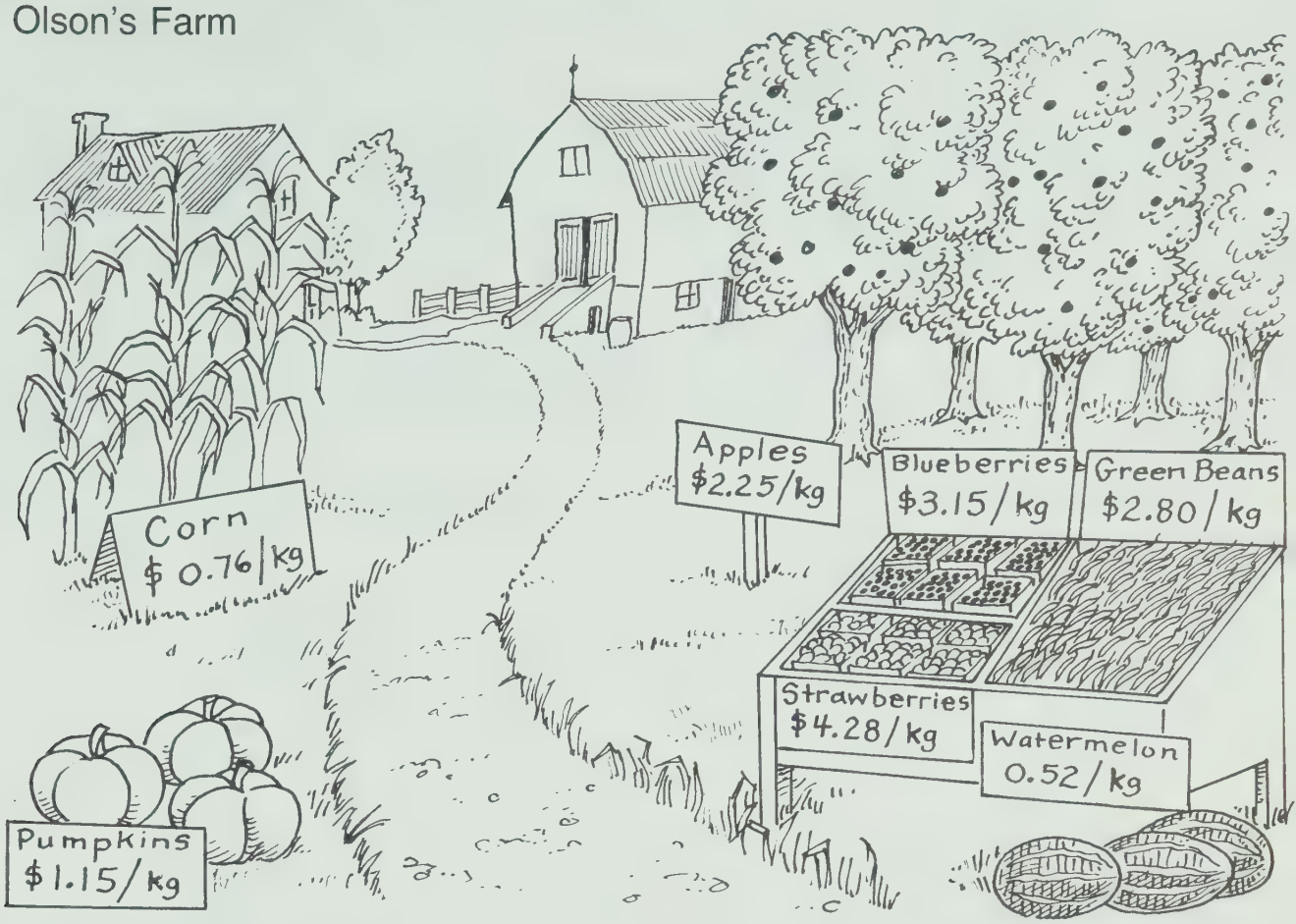
Kite Area

David drew this pattern for a kite he plans to make.



Compute the total area of the kite. _____

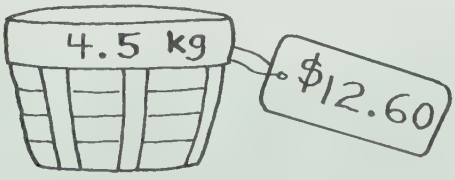
Olson's Farm



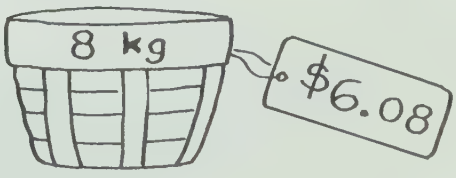
The price and the weight of each basket are given.
What is inside each basket?

1. _____

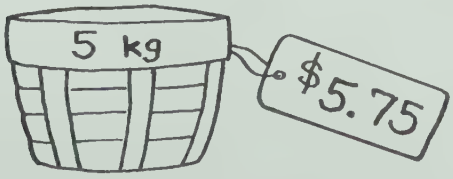
2. _____



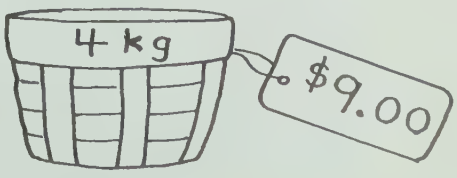
3. _____



4. _____



5. _____

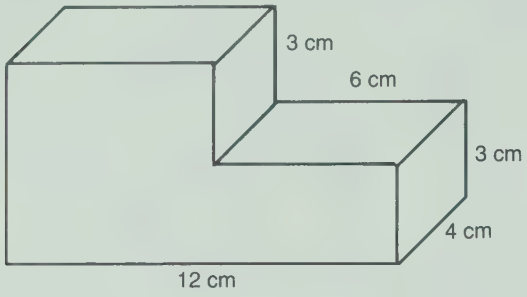


6. _____

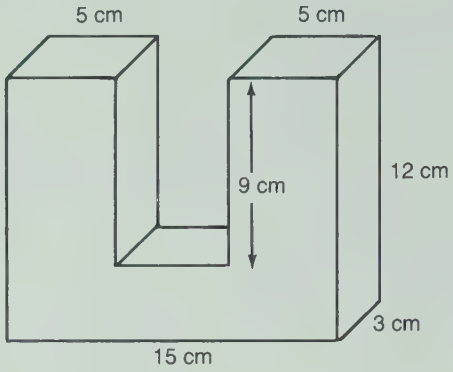
Volume Ticklers

Compute the volume of each figure.

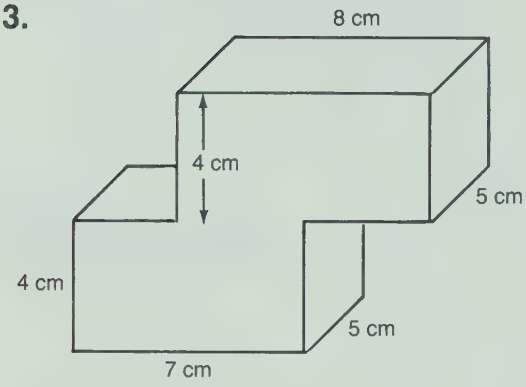
1.



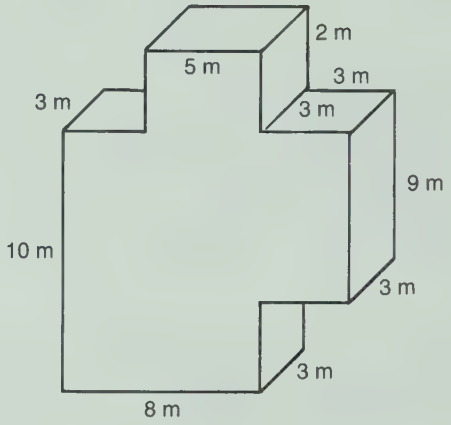
2.



3.

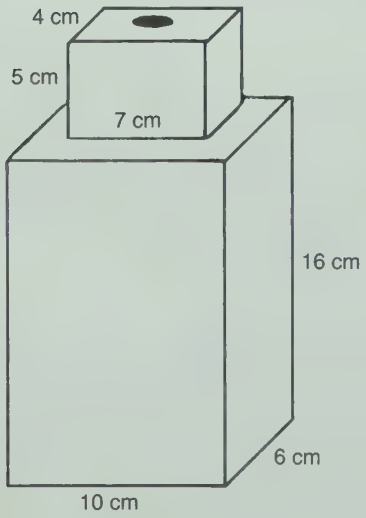


4.

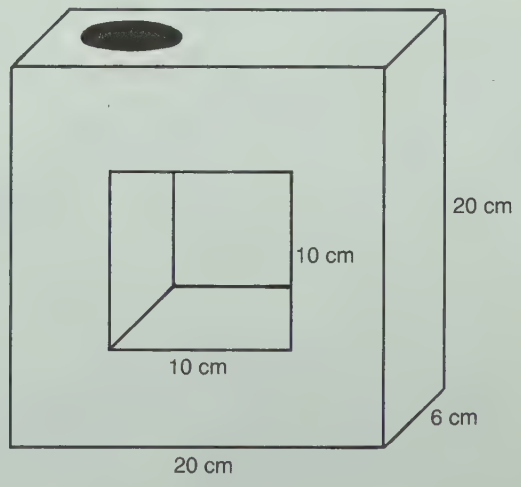


Give the mass of water each container can hold in grams and kilograms.

5.



6.

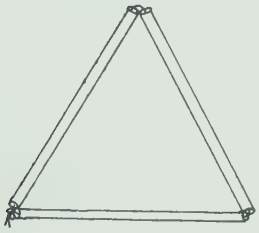


Octahedron Project

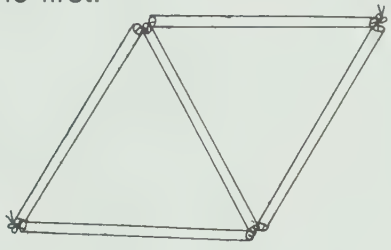
Polyhedra are solids each of whose faces is a polygon. In nature, rock crystals, bees' honeycombs, and wasps' nests are examples of polyhedra.

Follow the directions to make an octahedron. You will need string and 6 straws. Cut each straw in half. All 12 pieces must be the same size.

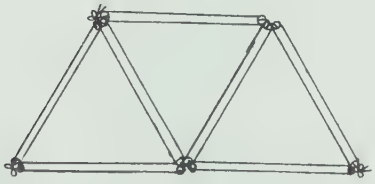
1. Thread 3 of the straws together to make a triangle.



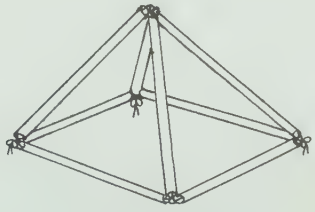
2. Thread another piece of string through one side of the triangle you just made. Now use 2 more straws to form a second triangle connected to the first.



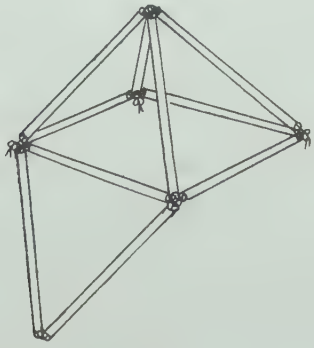
3. Connect a third triangle in this way by attaching 2 more straws to the second triangle.

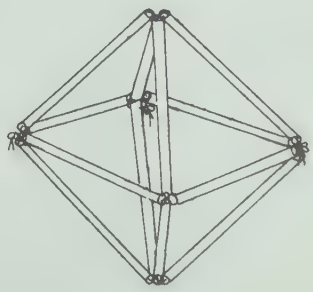


4. Thread the string through one side of the first triangle and one side of the third triangle. Connect one more straw. You will now have the top section of an octahedron.



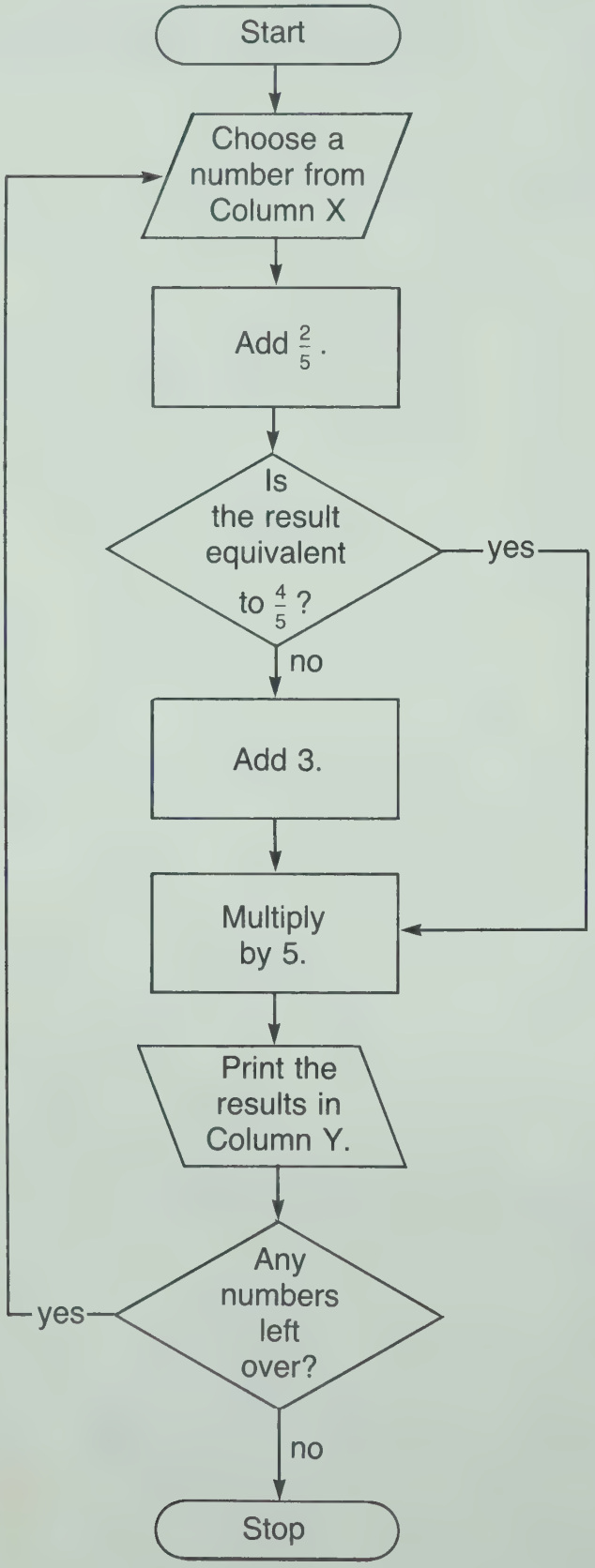
5. Complete the bottom half of the octahedron by threading straws to form 4 more triangles. Each of the 4 straws at the bottom of the top half will be a side of the new triangle.





Fraction Flow Chart

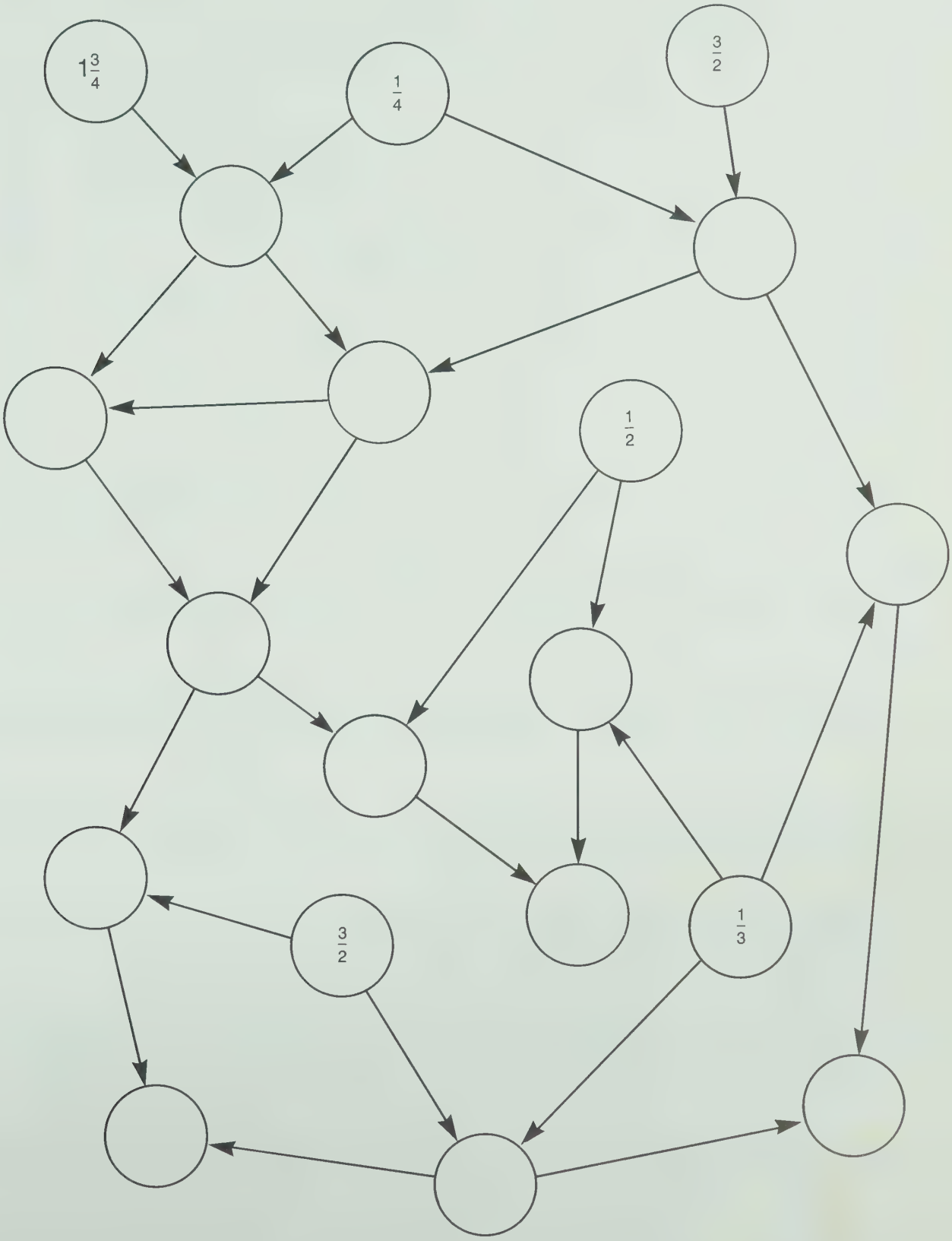
Write the correct number in Column Y by following the steps in the flow chart.



X	Y
$\frac{4}{10}$	
$\frac{9}{15}$	
$\frac{8}{20}$	
$\frac{15}{25}$	
$\frac{12}{30}$	
$\frac{21}{35}$	
$\frac{16}{40}$	

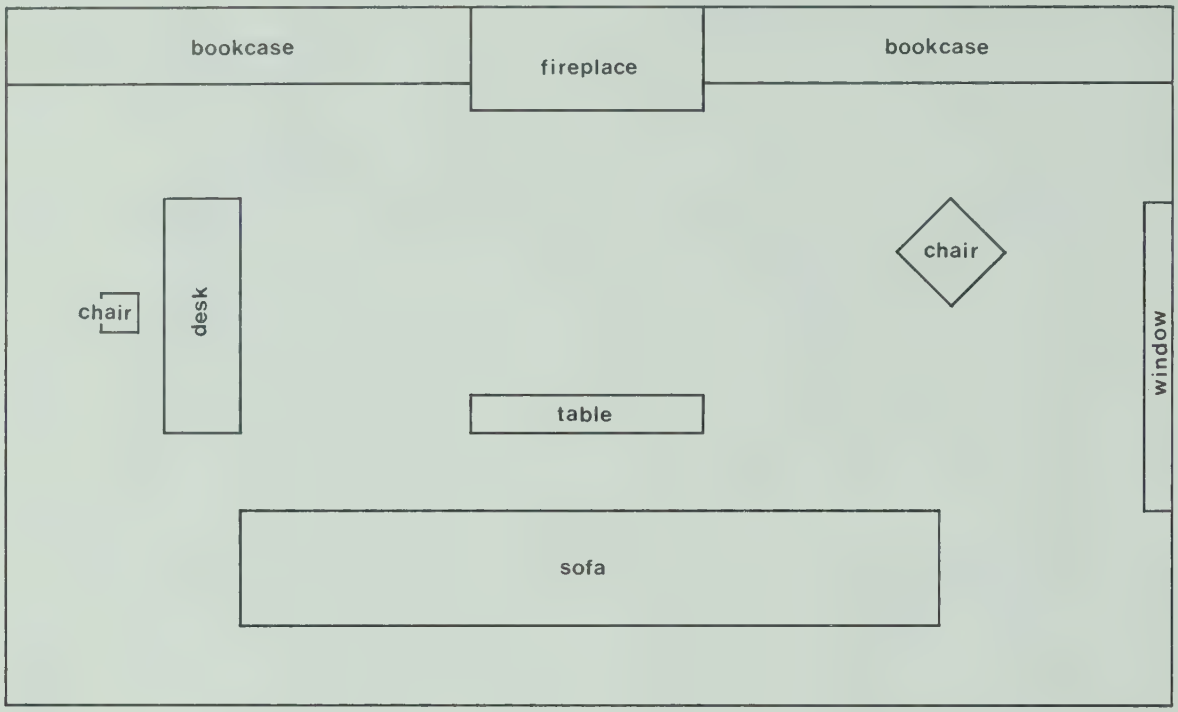
Fraction Puzzle

Complete the puzzle. Add the two numbers in the circles whose arrows point to the same empty circle.



Scale Drawing

Here is a floor plan of the Wilsons' living room.



SCALE: 3cm = 1m

Use a ruler and the scale to answer the questions.

1. What is the actual perimeter of the room?

_____

2. Mrs. Wilson wants to purchase wall-to-wall carpeting. How much carpet is needed?

_____

3. Could an ink blotter measuring 0.5 m by 1 m fit on top of the desk?

_____

4. What is the actual area of the top of the desk?

_____

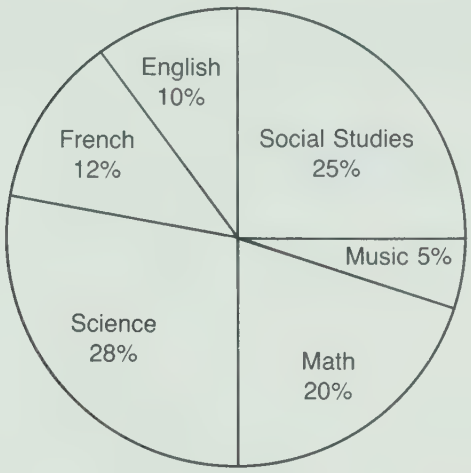
5. Mrs. Wilson is buying a window shade. How wide should the shade be to cover the window?

_____

Circle Graphs

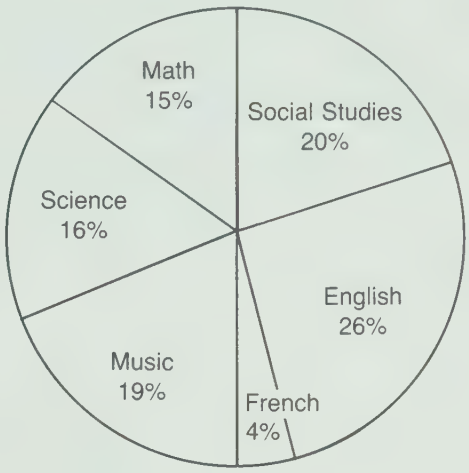
The two circle graphs show the percent of time Dino and Stephen spent on their studies during one week.

Dino



4 hours

Stephen



4 hours

1. What is the sum of the percents on each graph?

_____ _____

2. On which subject did Stephen spend the most time? _____

3. How many minutes did Dino spend during the week studying music? _____

4. How many minutes altogether did Stephen and Dino spend studying math?

_____

5. How many minutes during the week did Dino spend studying math and social studies?

_____

6. Dino studied one subject for 24 min during the week. What subject was it?

_____

7. How many fewer minutes during the week did Stephen spend studying social studies than Dino?

_____

8. Stephen studied one subject for 36 min during the week. What subject was it?

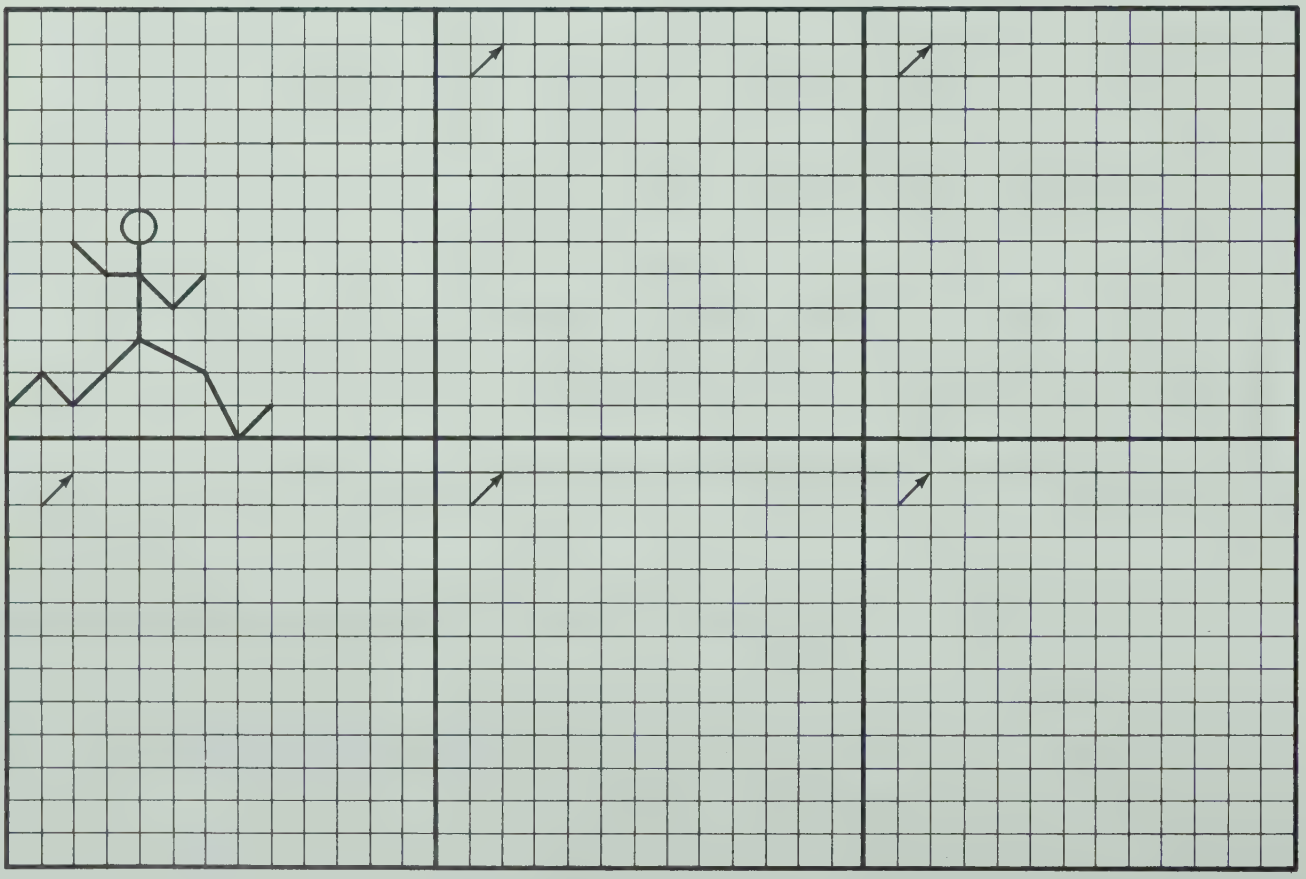
_____

Create a Movie

The simplest motion picture is a series of pages that flip quickly through your fingers. Objects appear to be moving because each page places the objects further along a slide or turn.

Create your own motion picture by following these directions.

1. In each box, draw the slide image of the shape in the previous box for the slide arrow shown.
2. Cut out the boxes. Place them in a pile in reverse order. The first picture should be at the bottom of the pile.
3. Holding the top of the pile firmly in place, flip the pages through your fingers.



Decimal Paths

Use the clues to help you follow the path. When necessary, round your answer to the nearest hundredth.

Clues

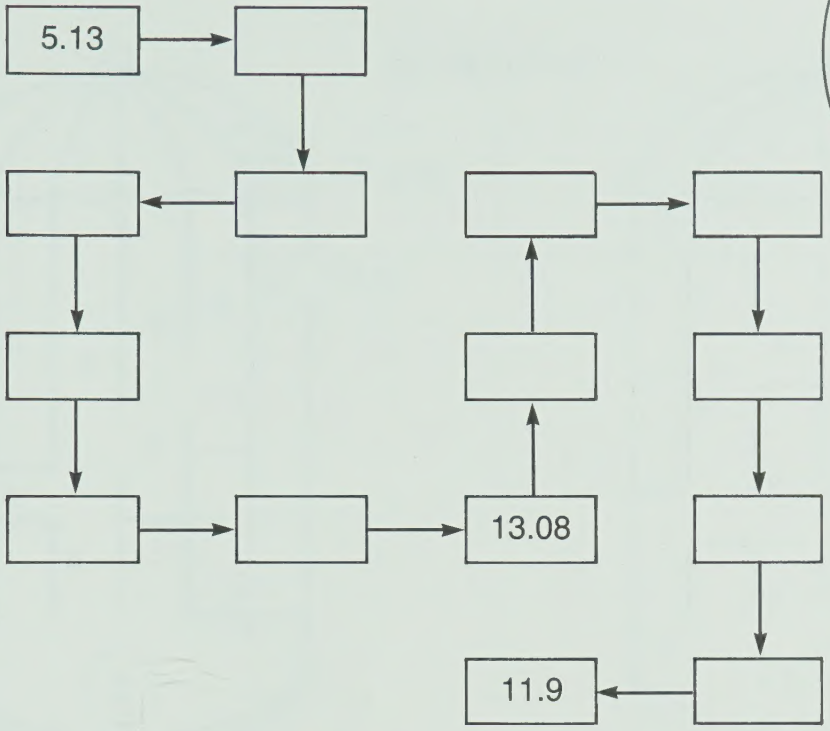
→ multiply by 2.05

↓ divide by 1.5

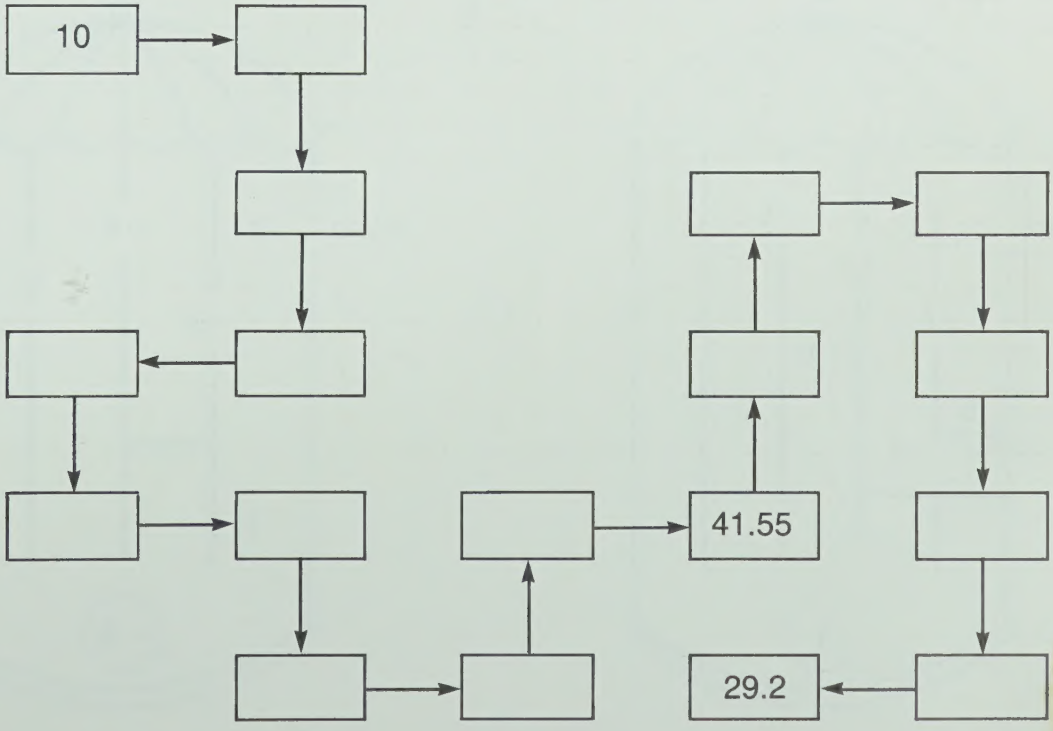
← round to the nearest tenth

↑ add 3.28

1.



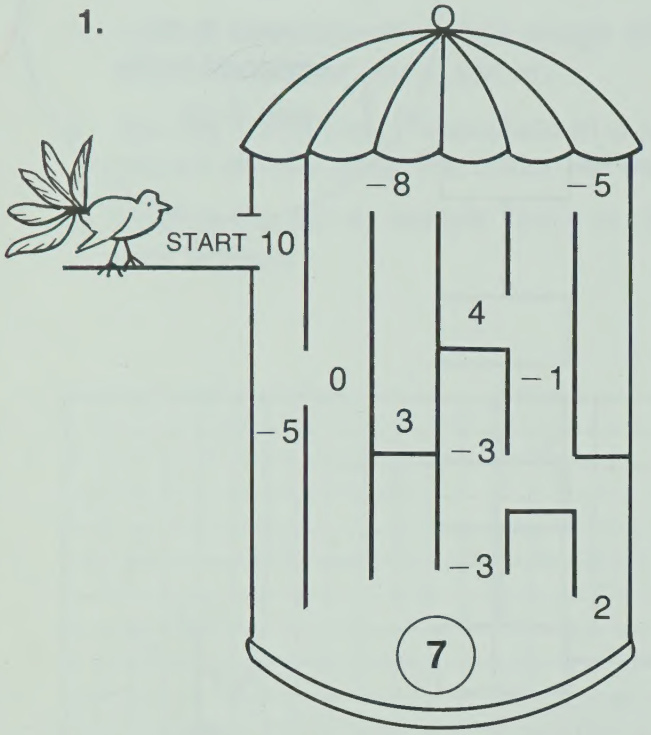
2.



Integer Maze

Work your way through each maze by adding the integers.
The sum of the integers along the correct path is equal to the number at the bottom of each maze.

1.



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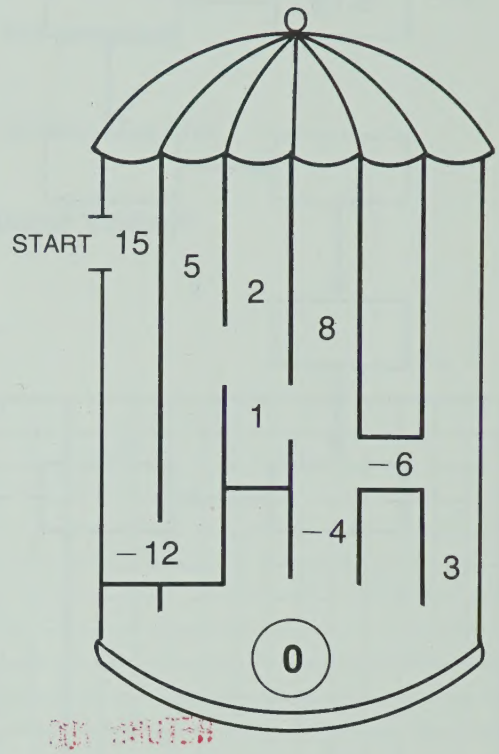

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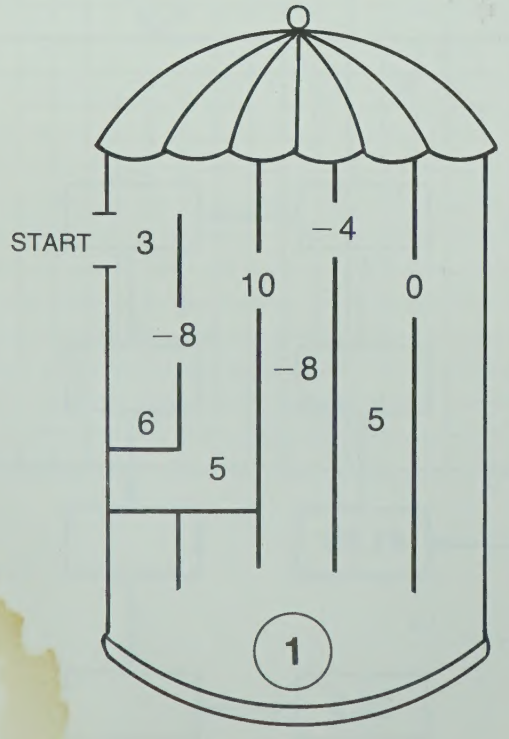

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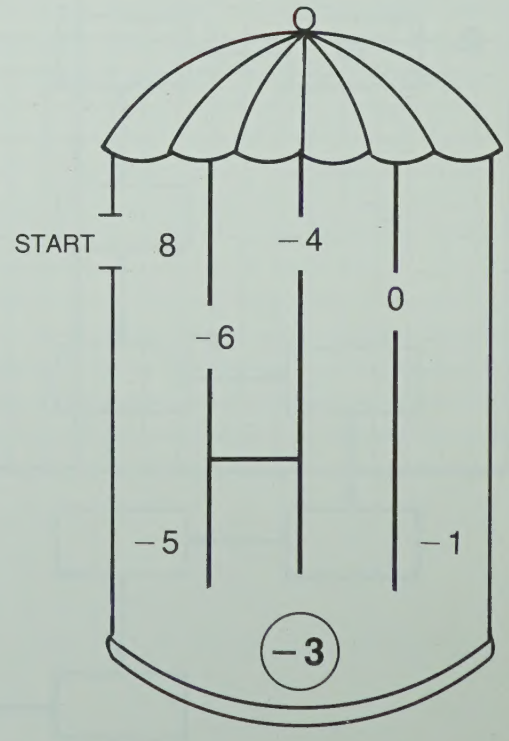

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